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ABSTRACT

This training module is part of a series that provides a basic introduction to using assistive technology with young children (ages 2 to 7) who have severe disabilities in more than one area of development. This module focuses on technology that gives children another way to communicate when speaking is difficult or impossible. The module presents a four-phase intervention process built around a child's educational curriculum. The focus is toward helping the child achieve functional skills in all areas of life, including home, school, and community. The module begins with an introduction outlining the role of technology and members of the technology team and then provides an overview of communication, including the benefits of augmentative communication. The four phases are then presented: assessment and evaluation of effectiveness; program development and communication system implementation; expansion; and independence and growth. Within the discussion of each phase of intervention are descriptions of helpful tools, techniques, and strategies. Sample action and participation plans are also included to demonstrate how a child can be moved forward in his or her use of assistive technology. Appendixes provide an assistive technology resource list, examples of high technology devices, graphic symbol sets and systems, an interaction profile, a communication skill inventory, a communication assessment protocol, other inventories and rating scales, and a list of resources on devices and implementation strategies. A videotape, entitled "Assistive Technology: We Can Do It!," was developed to accompany this module and related modules (Contains 23 references.) (JDD)

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Technology in the Classroom

Applications and Strategies for the Education of Children with Severe Disabilities

Communication Module

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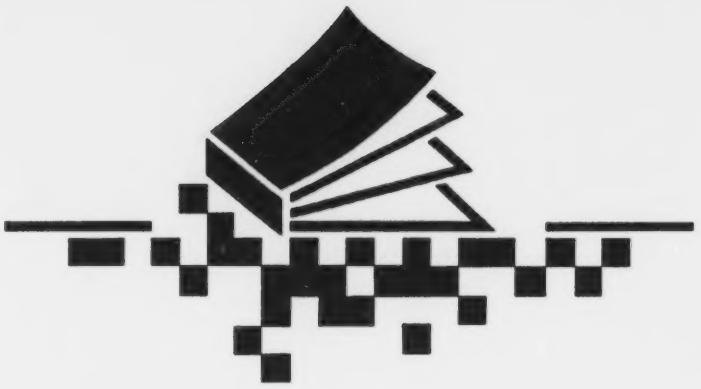

Communication Module

Technology in the Classroom

Applications and Strategies for the Education of Children with Severe Disabilities

by

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edited by

Nancy T. Harlan

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American Speech-Language-Hearing Association

September 1992

COMMUNICATION MODULE

Our apologies to Charity Rowland and Philip Schweigert of the Oregon Research Institute for omission of credit to them for the pictures appearing on pages 16, 18, 55, and 60. We are most appreciative of their kind contribution.

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Dedicated to the families, teachers, and service providers who are untiring in their efforts to help young children with severe disabilities reach their full potential.

The purpose of this module is to give you information about assistive technology that will be helpful to you and your child or the children you serve. Therefore, make it work for you. Read only what you want to know now; read the rest later when it is pertinent to your needs.

Preface

With the advent of assistive technology, a new world opened up for children with severe disabilities. They now would be able to move about, communicate, and learn, often alongside their able-bodied peers. However, making this technology available to these children and teaching them how to use it was not, and is not, an easy task. How do you go about informing educators and related service providers about the intricacies, challenges, and benefits associated with using technology? How do you help them to become comfortable using assistive devices as tools that can enhance, rather than interfere with, their daily teaching and other responsibilities?

Technology in the Classroom: Applications and Strategies for the Education of Children with Severe Disabilities, a 3-year project funded in part by the U.S. Department of Education, tries to address these questions. The American Speech-Language-Hearing Association (ASHA) designed this project to develop, field-test, and evaluate the effectiveness of self-instructional materials that would improve the knowledge and skills of families, teachers, and related service personnel so that they could use assistive technology effectively in the educational programs of young children with severe disabilities. Development of these materials involved the collaborative effort of many individuals who contributed significantly to the final products.

Authors. These materials were authored by clinicians and teachers who have many years of experience in the field of assistive technology. Sarah W. Blackstone, E. Lucinda Cassatt-James, Elaine Trefler, and Carol Flexer all have seen young children struggle to walk, talk, learn, and listen before most of the assistive technologies available today existed. They know today's technology because their input helped to develop it. It was their vision and creativity that guided the direction of this project. Their respect for children, their skills in determining children's needs, and the depth of their knowledge regarding strategies to use in meeting those needs have been demonstrated in the content of the project materials, along with their ability to share this knowledge in a clear and understandable manner. We all are indebted to these women for their long-term dedication to, and advocacy for, children with disabilities.

Site Coordinators. Two field tests were conducted during the course of the project to help us determine whether the project materials were actually useful in providing families, teachers, and related service providers with strategies for incorporating assistive technologies into the educational programs of young children. A local field test was conducted in Montgomery County, Maryland; we are grateful to Tom O'Toole, Sandra Lebowitz, and Nancy Gould for helping us to conduct this field test and for facilitating a smooth working relationship with public school personnel. The second field test, which was conducted at the national level, was made possible by the willingness and gracious efforts of Peggy Locke in Minnesota, Richard Lytton in Rhode Island, Judy Montgomery in California, and Gail Van Tatenhove in Florida. Not only did they locate the field-test sites and

participants, but with their knowledgeable input they facilitated the fine-tuning of field-test evaluation instruments to better suit potential field-test participants. They also provided valuable input into the structuring of project materials. Their enthusiasm for the project, their care in completing tedious tasks, and their collective sense of humor all contributed enormously to the successful completion of the project.

External Advisors and Peer Reviewers. So many individuals gave freely of their time and energy to review the project materials, each contributing to the preparation of a better product. With heartfelt thanks we acknowledge Mary Brady, Linda Burkhart, Philippa Campbell, Cynthia Compton, Susan Elting, Don Goldberg, David Hawkins, Susan Hough, Mary Blake Huer, Bill Lee, Janice Light, Bill Lynn, Noel Matkin, Shirley McNaughton, Beth Mineo, Marion Panyan, Kathy Post, Susan Quinlisk-Gill, Eileen Raab, Mark Ross, Janis Speck, and Lana Warren.

Internal Advisors. This group (Stan Dublinske, Kathryn Nickell, Cassandra Peters-Johnson, Diane Paul-Brown, Helen Pollack, and Jo Williams) supported the project throughout all of its phases and provided insightful suggestions, for which we are extremely grateful.

Project Staff and Significant Others. Special thanks to Mary Anzelmo for getting the project started, and to Ellen Fagan, ASHA's director of continuing education, for helping us to develop the project's field-test tools that were so effective in demonstrating changes in field-test participants' attitudes. Ellen also was an appreciated counsel with regard to field-test procedures and data analysis. Tarja Carter, director of ASHA's graphic services, and her staff were a source of never-ending talent when it came to preparing text, brochures, posters, module covers, and all project artwork. Joanne Jessen, ASHA's director of publications, and her staff of editors who reviewed the project documents provided advice regarding publication issues and editorial questions. Personal thanks go to Charles Diggs (ASHA's director of consumer affairs) for his counsel in preparing the project videotape, and to Amie Amiot for her untiring efforts in formulating statements about public laws. If it had not been for James Gelatt and Camille Catlett, who were responsible for the original grant preparation, this project never would have begun. Acknowledgment also goes to our project officer, Patricia Hawkins, and the Office of Special Education Programs, U.S. Department of Education, for their continuing support.

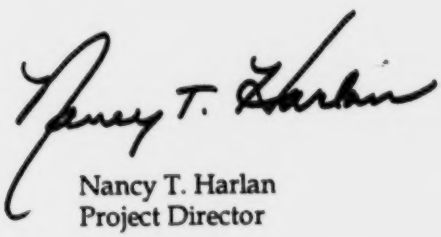
Stan Dublinske, director of ASHA's Professional Practices Department, was a constant source of strength with his clear thinking and concise solutions to some of the thornier problems. Cheryl Wohl contributed liberally during the initial phases of the project and carefully saw to the preparation of field-test materials. Many thanks for her continued support.

The project, however, would never have come to completion without the guidance of the project manager, Deborah Bruskin, who held the hand of this project director until she knew the ropes of the National Office and procedures for interfacing with the Department of Education. This moral support continued and made

possible the project's movement through its more difficult times. Her excellent writing skills helped significantly in developing the written materials. Many thanks to a competent colleague and constant friend.

Personally, I have grown markedly from my involvement in the development of this project. Most certainly, it has changed the direction of my professional life, and I sincerely thank all those with whom I have had the pleasure of working for these past months.

We hope that the results of our efforts, including three modules, one supplement, and one videotape, will find their way into the hands of families and professionals eager to meet the technology needs of young children with severe disabilities. We present them to you with some measure of assurance that they will be helpful and that, hopefully, children's potentials will be better realized. In a world of such rapid technological changes, I challenge you to get started now! It may be your own insight and experience that contribute to a second publication of this sort.



Nancy T. Harlan
Project Director

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Chapter I Introduction

Welcome to the world of assistive technology! If you are reading this module, you are undoubtedly curious about what assistive technology means and the role of this technology in the education and lives of young children with severe disabilities. As defined by the Education of the Handicapped Act Amendments of 1990: "The term 'assistive technology device' means any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities." [Sec. 101(g)]. Many of you may be from the "paper and pencil generation" or may have used technology in a business context only. Whether you are a family member, a teacher, or a related service provider, you consider yourself a novice in the use of technology for young children with severe disabilities.

To ease your entry into this new and exciting area, we have prepared a series of modules that provide a basic introduction to using assistive technology with young children (ages 2–7) who have severe disabilities in more than one area of development (i.e., motor, communication, and/or cognitive). However, the content of these materials may be extremely helpful to families, teachers, and related service providers of children who have a severe or even mild disability in only one area of development. The *Communication Module* delves into technology that gives children another way to communicate when speaking is difficult or impossible. The *Positioning, Access, and Mobility Module* gives readers ideas about how to position children comfortably so they can participate in the activities of life, as well as ideas about helping children activate technology and move about even when their arms and legs are inefficient or do not allow them to crawl or walk. The *Education Module* has descriptions of technologies that help children do pre-academic as well as academic tasks—tasks that help them learn how to learn. It also addresses computer terminology and adaptations to computers that make them usable by children with disabilities. A supplement entitled *Listening and Hearing* contains suggestions about hearing technologies and listening strategies that improve a child's opportunities to learn from his or her environments. The accompanying videotape, entitled *Assistive Technology: We Can Do It!*, provides an overview of the technologies and strategies discussed in the written materials and shows children using them successfully in learning environments.

Parents and professionals who reviewed the modules (as part of a national field test) agree the videotape is most helpful when viewed before reading a module. This national field test of project materials also revealed two statistically significant findings: (a) 62 family members as a group and 99 professionals as a group became more comfortable with their knowledge of assistive technology, and (b) the professionals as a group began to feel more competent in using assistive technology. Preliminary findings of a local field test (conducted before the national test) indicated findings similar to (a) above. Follow-up of local field test participants one year later indicated an increase in participants' (a) level of awareness of assistive technology, and (b) efforts to seek additional information and resources about

assistive technology. Thus, we present these materials to you with some degree of confidence that they will be helpful.

Role of Technology

Technology has become an integral part of the lives of all children today. Two-year-olds are operating the remote control for the television, turning on lights, and pushing the button on the automatic garage door opener. Three-, four-, and five-year-olds, as well as first and second graders, are operating microcomputer-based toys, such as "Speak and Spell," and are playing computer games at home using their parents' or older siblings' computer.

Assistive technology enables children with severe disabilities to participate more fully in all aspects of life (home, school, and community) and helps them access their right to a free, appropriate, public education in least restrictive environments. Part B of IDEA* states that a child's needs for assistive technology services and devices must be considered by the team formulating his or her Individualized Education Program (IEP) or Individualized Family Service Plan (IFSP). If the team determines that the child needs assistive technology to receive a free, appropriate, public education in the least restrictive environment, the child's IEP/IFSP must include a specific statement of such devices and services, and these devices and services must be provided. This is a landmark decision that allows students with severe disabilities to be fully integrated into the educational system. Although this decision will improve the quality of education for children with disabilities, it also presents a great challenge to the teachers and families, as well as a variety of service providers, who must use the technology to assist these children as they strive to achieve independence in a difficult world.

The perspective of the authors is that assistive technology is an enabling tool that provides access to learning. It is most effective when applied in combination with traditional teaching techniques to achieve the best learning environment for children with disabilities. Alone or in combination with other techniques and strategies, assistive technology is not a panacea for all learning challenges. Experience has shown that a child's ability to operate a piece of equipment has little impact on his or her educational achievement. For example, simply using a switch to turn on a toy does not necessarily mean that an understanding of cause and effect has occurred. This ability is only one of many events in a child's life that may lead to the acquisition of such a basic cognitive skill. Likewise, pointing to symbols on a vocabulary overlay does not spontaneously translate into functional use of those symbols for purposeful communication.

Applied carefully and skillfully, assistive technology can play an important role in meeting the needs of children with severe disabilities. Technology can assist these children in participating in the educational curriculum and in acquiring social skills (now being able to interact with peers and siblings). It can help them master skills needed for independent living. They do not miss out on the fun and excitement of being children.

* This is an amendment to the Education for All Handicapped Children Act of 1975 (P.L.94-142), which was first amended as P.L.99-457.

Myths About Technology

Myth # 1: Technology limits speech and mobility.

Almost anyone who has had to decide whether a child should be given technology has asked the following questions.

"Won't technology keep children from learning to walk or to talk? Won't it make them lazy so they don't try as hard to develop their abilities?"

- We need to think of assistive technology as *a supplement, not a replacement,* for skills that are not yet present. Assistive technology may actually facilitate the development of skills or at least allow for the development of parallel skills. For example, the lack of mobility could delay cognitive development or social independence. However, with the provision of a mobility system, children can explore their world, fulfill family responsibilities such as getting to the kitchen on time for meals, or participate in school routines such as delivering messages to the school office. If walking for short distances becomes possible, the mobility device might just be used for activities such as playing on the playground at recess. The idea of a "wardrobe of devices" can be helpful (i.e., providing the child with a collection or choice of mobility options). This is not unlike children without disabilities who use various methods of mobility, such as bicycles, scooters, skates, and so forth. It is vital to remember that a specific assistive device can always be discarded if and when a child acquires new skills.
- The early application of augmentative communication approaches does not inhibit the development of speech and language and may actually *prevent the establishment of maladaptive communication patterns* (Blackstone, 1990). If, for example, initial attempts at interaction get off to a bad start (either because the children's communication signals are not being sent or not being received), the probability of the children acquiring an awareness that what they do has a specific effect upon others in their world is very low. This set of circumstances is known to lead to "learned helplessness," behavior problems, or passivity, which constitute major barriers and handicap people well beyond their level of impairment later in life (Abramson, Seligman, & Teasdale, 1978). Assistive technology can facilitate children's communication so that their communication attempts are more accurately understood and responded to.

Viewing the success that other children with similar disabilities have had with assistive technology can be very beneficial. Videotapes, films, written materials, support groups, and live observations can all be helpful in seeing the long-term benefits of technology.

Myth # 2: New technology is very difficult to use.

Many of us are skeptical about our own ability to use complex equipment; just the thought of using assistive technology arouses feelings of anxiety and intimidation. However, it is important to remember that:

- To facilitate your child's use of technology, you do not have to be an expert in using computers or other such "high tech" devices. There are experts who are trained to help you understand how the technology works.
- You learn only the functions of the computer/device that your child needs now. When your child needs a new function, you both can learn how to do it.
- Don't be put off by the terminology that is used when discussing computers or technology in general. As you begin to understand how to make the device work for your child, you will learn the related vocabulary.
- Although the first few steps taken toward the implementation of technology may be difficult, competence comes gradually and will eventually provide you with a sense of accomplishment and pride, both for yourself and for your child.

And there are resources that can help. Federal legislation has mandated that all states be funded to develop consumer-responsive, statewide, technology-related service delivery. Those states funded to date and their respective addresses and telephone numbers appear in Appendix A, "Assistive Technology Resource List." Also included in Appendix A are listings of organizations and agencies that provide assistance about applications of assistive technologies, pertinent publications, funding resources, and databases of assistive technology resources (e.g. manufacturers, products, publications, and services).

Realities About Technology

Reality # 1: Assistive technology is still being developed.

Assistive technologies for young children have not yet been developed/refined to the level of the television or the telephone. Because of this, limitations, "bugs," breakdowns, problems, and irritations exist, and we need to be prepared for them.

Reality # 2: Funding for assistive technology is a challenge.

Although funding is and will no doubt continue to be a challenge, this situation has improved in recent years. Funding sources now include federal and state programs, private insurance, and other sources, such as philanthropic groups. The Funding Resources section of Appendix A contains a list of current manuals and references that can help families and professionals sort through this funding maze. Equipment manufacturers also frequently provide information about funding resources.

Reality # 3: Applications of assistive technology take time and effort.

Utilizing assistive technology is time-consuming. For example, many, many symbol displays/overlays must be developed to enable one child to communicate at school. This child also requires displays/overlays for communicating at home and in the community. The child's communication aid also will require program-

ming. In addition, planning and meeting time must be provided if assistive technologies are going to be fully integrated into a child's learning environments.

As this technology becomes more sophisticated, it also is becoming easier to use. For example, communication symbol displays now can be created and then produced on a printer. Some communication aids can be programmed by pressing buttons and speaking into a built-in microphone. Manuals are user-friendly, and manufacturers offer workshops and videotapes to help people understand how to use the equipment that they purchase.

In spite of these advances, it is necessary for administrators to understand that preparation, planning, and meeting time is needed if assistive technologies are going to help children be successful in reaching their full potential.

Reality # 4: Assistive technology should be used with care

Assistive technologies are wonderful tools, but if they are used without discretion or inappropriately, they can harmful. For example, providing a child with an assistive listening device without input from an audiologist regarding amplification settings can result in permanent hearing loss. A child using an electric wheelchair without instruction from the occupational or physical therapist may be unable to stop the device before it rolls into a busy street or hits other children. Choosing augmentative communication aids without the expertise of a speech-language pathologist who knows the broad range of options and their suitability for children with different language capabilities can result in such frustration that a child's overall desire as well as ability to communicate may be diminished rather than increased. It is very important to seek out knowledgeable guidance from trained professionals so that the right decisions can be made about assistive technology devices and their applications.

Technology Team

It is essential that decisions about a child's use of technology be made by a team of professionals and family members to ensure that the child will benefit from a broad perspective of knowledge and experience. Members of a child's team change over time; only the child and, sometimes, the family remain constant. Thus, although each team member plays an important role along the way, the job of a team is to empower the child and the family to make decisions, to take control of the process, and to seek out new resources when they need them.

Research and practice suggest that teams function best when roles and responsibilities are clearly delineated. The members who usually make up a child's team are described below*:

- **Child** – Children are the only constant on the team, bringing with them their unique personalities, abilities, challenges, and fantasies. The children are active

* Except for the child and the family, potential team members have been listed in alphabetical order.

participants, and their opinions must be respected and valued. After all, they are the ones who will or will not benefit from technology, and will or will not use it.

- **Family** – The family provides support and helps to develop the child's world knowledge base. It is important to realize that many families have concerns unrelated to their children with disabilities that will affect their level of participation. In some cases, cultural issues and existing family dynamics may even inhibit active involvement. Varying degrees of participation are understandable and acceptable. The family can be a child's best advocate and can develop a child's sense of confidence, self-esteem, and independence.
- **Aides/instructional assistants** – These individuals work with teachers to implement the curriculum and make learning possible. They play a key role in fostering peer interaction, self-confidence, and independence.
- **Audiologists** – Audiologists test hearing, recommend hearing technologies, and provide instruction in the use of hearing technologies. They also give suggestions for enhancing children's listening skills.
- **Classroom teachers** – The classroom teacher is responsible for the child's total education program. Teachers must balance the activities and time available during the school day and collaborate with the family and other professionals to ensure that the "educational path" is followed. They develop and implement educational strategies that allow assistive technology users to participate in classroom activities so that functional, academic, and social goals can be accomplished.
- **Occupational therapists** – Occupational therapists, like physical therapists, evaluate children's posture and mobility. Occupational therapists then recommend and implement procedures and devices that will meet seating and mobility needs. In addition, occupational therapists help determine which devices and strategies children can use to access other technologies, such as those for learning and communicating, as well as moving.
- **Peers** – Children's peers may be friends, classmates, helpers, and tutors. Peers provide emotional support and a special link to certain aspects of children's lives in which adults have little involvement. They provide models for learning and communicating.
- **Physical therapists** – Physical therapists evaluate children's posture and mobility and are subsequently involved in recommending and implementing a variety of techniques, devices, and strategies that will appropriately position the children to facilitate their comfort, proper development, and safety, and that will increase their mobility.
- **Physicians** – Physicians address medical issues and monitor medical complications. They are involved in the prescription of the seating and, often, the mobility device. The physician helps to procure funding from third-party payers (e.g., insurance companies).

- **Psychologists** – Psychologists assess children's intellectual abilities and learning styles. They must be skilled at making necessary adaptations to determine a child's cognitive functioning, taking into account present physical disabilities and behavioral characteristics.
- **School principals, directors of special education, superintendents** – These designated leaders have job descriptions that involve management of educational programs and fiscal issues. They are leaders and set the tone. They understand the school system and often can make things happen. They have the authority to allocate staff time as deemed appropriate. Their support is often critical to the successful implementation of assistive technology.
- **Special educators** – Teachers with special education backgrounds develop an in-depth understanding of each child's cognitive profile and learning style as they relate to the curriculum. Based on this knowledge, the special educator can modify curriculum goals and materials and provide additional resource support, such as recommending software that enables children to participate in classroom activities (e.g., art projects, creative writing).
- **Speech-language pathologists** – Speech-language pathologists suggest ways to maximize a child's speech, language, and communication during each activity (e.g., use of a communication device during circle time and a mini-board at home during bathtime). They often help develop vocabularies, design overlays, suggest strategies to facilitate interaction, and integrate speech and language development into the educational curriculum.
- **Team facilitator** – This individual possesses the knowledge and the skills to coordinate team meetings, ensure follow-through of team goals, see that time lines are met, and generally manage team activities so that no activity deemed important "falls through the cracks."
- **Technical resource personnel** – Rehabilitation engineers and/or technologists and assistive equipment suppliers/manufacturers help make decisions when specific technology is being considered. They can assist in procuring, designing, fitting, and maintaining the equipment and can also help in setting up/modifying equipment and software and designing work stations.

The individuals cited above play an important part in helping children use technology effectively. The roles they play often vary; those who implement the use of technology are not always the same as those who prescribe or design it. The level of expertise among these people in using technology also varies. Each person contributes his or her own unique skills, talents and personality; together they make assistive technology work. And, it is important that teams provide continuity and plan for smooth transitions as the child grows and moves through the educational system.

Service Delivery Models

Service delivery to children with severe disabilities can generally be categorized according to different "models," three of which are described below. Within each

model, note how the focus of attention and the responsibilities change. Professionals and families vary as to the model with which they feel most comfortable. As families' needs change or as they learn more about dealing with their children's technology needs, they may change their model of choice. In some settings a certain model may be required, but within each circumstance there should be flexibility to meet the needs of both the children and their families.

- **Family-centered model:** This model is designed to
  - empower and enable the family as a system,
  - promote independence, not dependence, and
  - support and strengthen the family's competence in negotiating its own course of development.

  In the United States, the family-centered approach is an integral part of service delivery in infant and toddler programs with funding under the Individuals with Disabilities Education Act (IDEA).
- **Medical model:** This model is child-centered (i.e., the professional focuses on bringing about changes in the child). Families are often not expected to take an active role.
- **Educational model:** The educational model reflects the regulations inherent in P.L. 94-142. Intervention is child-centered, and success often is measured by whether discipline-specific goals are met. Families are expected to be part of the decision-making and training process; the training of family members and the development of home programs are inherent to this model.

No matter which model is used, unless there is collaboration among the team members, the implementation of assistive technology is doomed.

> In the collaborative model, it is assumed that no one person or profession has an adequate knowledge base or sufficient expertise to execute all the functions (assessment, planning, and intervention) associated with providing educational services for students. . . . All team members are involved in planning and monitoring educational goals and procedures, although each team member's responsibility for the implementation of procedures may vary. Team members can be considered as sharing joint ownership and responsibility for intervention objectives. (ASHA, 1991)

Communication Module

Now that you have a brief background in assistive technology, you are ready to delve a little deeper into the specific ways it can be used to help young children with severe disabilities. This module presents a four-phase intervention process that has been successfully used within educational programs for young children with severe communication disorders. This intervention process is built around a child's educational curriculum. Although it takes into account the flow of developmental milestones, the focus is toward helping the child achieve functional skills in all areas of life, including home, school, and community. Within the discussion of each phase of intervention are descriptions of helpful tools, techniques, and strategies. Sample action and participation plans are also included to demonstrate how a child can be moved forward in his or her use of assistive technology.

So read on, and be assured that with appropriate technology and support, all children, even those with severe disabilities, can grow up to be happy, participating members of their communities and society.

Chapter II Overview of Communication

Communication provides access to learning and allows children to participate in the educational process. If children are unable to express themselves or do not understand what is said (i.e., are unable to communicate), education cannot occur. Communication also underlies feelings of self-worth and enables children to form social relationships. Assistive technologies can help children with severe communication impairments by providing a link between them and their day-to-day learning and interactive experiences.

Guiding Principles

The following principles have guided the development of this module:

Communication has no prerequisites.

Communication begins at birth; therefore, intervention designed to enhance or facilitate the development of communication skills should also begin at a very young age.

Communication involves at least two people whose behaviors influence each other.

For young children, training communication partners should be a major focus of intervention. Plans should be developed to train the peers and siblings as well as the adults in the child's life. Partners may need instruction in how to use the child's assistive technology and may need to learn strategies to facilitate the child's functional use of the technology.

An adequate hearing environment is crucial to learning.

Even a mild to moderate hearing loss interferes with learning and is detrimental to the development of comprehension and spoken language as well as reading and writing skills (Wray, Hazlett, & Flexer, 1988). Intervention approaches should take into account and optimize the auditory (and visual) environments in which children are expected to learn and communicate. The *Listening and Hearing Supplement* addresses this important area.

Using communication forms other than speech will not interfere with the development of spoken language.

Everyone uses multiple modes of expression (e.g., gestures, facial expressions, body posture, speech, writing, drawing, music, and so on). In fact, nonverbal forms of communication are always present before speech and language develops and continue to enhance communication throughout our lives. Clinical reports and studies suggest that sign language, speech output devices, and special symbols do

not interfere with the development of speech in young children with severe disabilities (Kiernan, 1983; Bonvillian, Nelson, & Rhyne, 1981). Intervention programs for children at risk for developing speech should begin long *before* speech "fails" to emerge and should systematically explore the use of multiple modes of expression to augment (or serve as an alternative to) speech.

Speech/vocalizations should be encouraged no matter how severe the child's sensory, motor, or cognitive impairments.

The period between birth and 7 years of age is one of rapid speech development. It is important to take full advantage of these years and provide children with opportunities to practice using sounds and sound sequences that care providers can interpret as recognizable/meaningful utterances. Too often, family members and professionals do not realize how difficult it is to coordinate the approximately 100 muscles involved in producing intelligible speech. When children fail to begin "talking" in the second year of life, their utterances may be ignored because they are unintelligible. By providing children with opportunities to practice using sounds and sound combinations they are capable of producing and by encouraging adults to attach meaning to these utterances, we help promote the continued development of speech. While "practicing," these children should have other ways to express their thoughts and feelings, particularly if speech is not expected to develop adequately.

Language development always should be considered when planning communication intervention programs.

Principles of language intervention should be an inherent component of all communication programs for young children. For children who have difficulty speaking, it is often very difficult to determine what they understand. As a result, their language abilities are either underestimated or overestimated. Unrealistic expectations often translate into inappropriate educational and therapeutic goals. Intervention programs should first determine which modes of language (e.g., spoken, signed, graphic symbols, print) are most readily understood by a child. Then, these modes should be used to facilitate the language and communication development of the child.

Assistive technology should be incorporated into a child's already existing multimodal communication system.

Assistive technologies can greatly enhance communication skills, increase independence, facilitate the development of language, and provide access to learning and social opportunities. However, technology is never the *only* answer to a child's communication problems. Speech, gestures, signs, pictures, and special signals and codes remain important to children who have difficulty communicating. It is important for parents, teachers, and clinicians to help children and their communication partners realize that successful and efficient communication occurs only

when multiple approaches are used. For example, in many cases it is far better to roll your eyes in disbelief than it is to type out, letter by letter, "That was ridiculous." And, it is often faster to shake your head *yes* or *no* than to point to the word or symbol for *yes* or *no* on a language board.

Communication programs should take into account a multitude of variables.

Variables that should be considered include

- **the child** – characteristics, skills, and preferences, as well as current levels of performance and future needs;
- **partners** – adults and other children with whom the child interacts now or may in the future; and
- **contexts** – situations within which communication interaction occurs or could occur.
- **tasks** – things that need to be accomplished using communication.

A change in one variable will affect other variables. For example, when a 2-year-old boy with dual sensory impairments and cerebral palsy begins a preschool program, he meets many new partners. Because he needs to discover and become comfortable in this new context, and because he must have a way to participate in class activities and tasks, the tools he used to communicate at home (e.g., idiosyncratic signs) need to be expanded.

Definitions

It is difficult to discuss communication and technology without including some professional terminology. Descriptions of a few terms are listed below.

Augmentative Communication

All forms of communication that enhance or supplement speech (Vanderheiden & Yoder, 1986). *Augmentative communication* is a recognized area of clinical practice involving multiple disciplines. The international term for the field is "augmentative and alternative communication". The term "alternative" is used rarely because very few people with severe expressive communicative disorders have no intelligible speech. In most cases, standard and special forms of communication are used to augment existing speech and verbalizations.

- *Standard* forms of augmentative communication are those commonly used by the general public—natural gestures, facial expressions, eye gaze, head nod, writing, drawing, and a variety of communication aids such as the telephone, computer, typewriter, tape recorder, modem, and so on.
- *Special* forms of augmentative communication are developed for use by people with disabilities. They include graphic symbols, communication aids and devices, access devices (e.g., switches, head pointers), unique ways of transmit-

ting messages (e.g., codes and prediction techniques), computer software, manual signs, and so on.

Assistive Technology for Communication

Assistive technology for communication includes homemade or commercially available devices and techniques that enable individuals to accomplish communication tasks. Devices typically are classified as either *high-tech* (i.e., electronic, which plug into a socket or require a battery) or *low-tech* (i.e., nonelectronic, which include communication boards, wallets, wall displays, eye-gaze vests, conversation books, and so on).

- **Communication devices** – Many communication devices are available, some with printers, speech synthesizers, and communication software. Appendix B gives some examples. Booklets, communication boards, and wallets are widely used. Illustrations of several such devices appear throughout this module. The pictures/symbols/words displayed on devices are often designed by a speech-language pathologist specializing in augmentative communication to ensure that language learning and communication issues are taken into account. After displays are designed, however, they are often made by teachers, parents, older students, and/or volunteers.
- **Access techniques** – Methods of using communication devices fall into two categories:
  - *Direct selection*. The child points directly to each message with his or her eyes, finger, or foot, or uses a device such as a head stick or light pointer to select a message from a display or keyboard.
  - *Scanning*. Children with severe motor impairment may not be able to point to messages with any body part. Nevertheless, they can access messages in a more indirect manner using a technique called "scanning." Scanning entails presenting choices to a child one by one or row by row until the child indicates his or her choice. The scan can be done by a person or a machine, and messages can be presented both auditorily and/or visually. Scanning requires a child to do three things:
    1. Move a body part (e.g., finger, foot, head) or in some way indicate (e.g., vocalize) to the person or machine that he or she is ready to begin scanning the set of messages.
    2. Wait until a person (or a machine) gets to the desired message.
    3. Indicate to the person/machine (by signaling or hitting a switch) that the desired message is selected.

  There are several different types of scanning options for persons with severe motor impairments. Please note that direct selection techniques generally, *but not always*, allow individuals to generate messages more quickly than scanning techniques. However, making direct selections over long periods can cause fatigue. In that case, a combination of direct selection and scanning techniques or directed scanning techniques can be considered.

- **Access equipment** – To assist children in selecting messages directly on both low- and high-tech devices, mechanical and electrical access devices can be used, including special enlarged or mini-keyboards, light pointers, light sensors, head pointers, chin pointers, switches, and joysticks. (For additional information about access technologies and their applications, see the *Positioning, Access, and Mobility Module.*)

Language

Language involves a complex and changing system of conventional symbols used for thought and communication (*Asha*, June 1983). Languages are symbol systems. Symbols stand for concepts, ideas, objects, actions, locations, attributes, and so on. Languages allow us to combine symbols and capture our most complex perceptions, thoughts, and experiences using phrases and sentences. Language can be spoken or written, listened to or read. All languages consist of intertwined parts that develop quite naturally in young children. Language accomplishes multiple purposes.

When children are unable to produce intelligible speech, it does not mean that they have no language. More often, it means they need to use other types of language symbols to express themselves. Today, children who are unable to speak and/or write can use a variety of special augmentative symbols to express complex thoughts:

- **Manual signs** – symbols produced using the body and hands (e.g., American Sign Language; Signing Exact English) (see Figure 1).

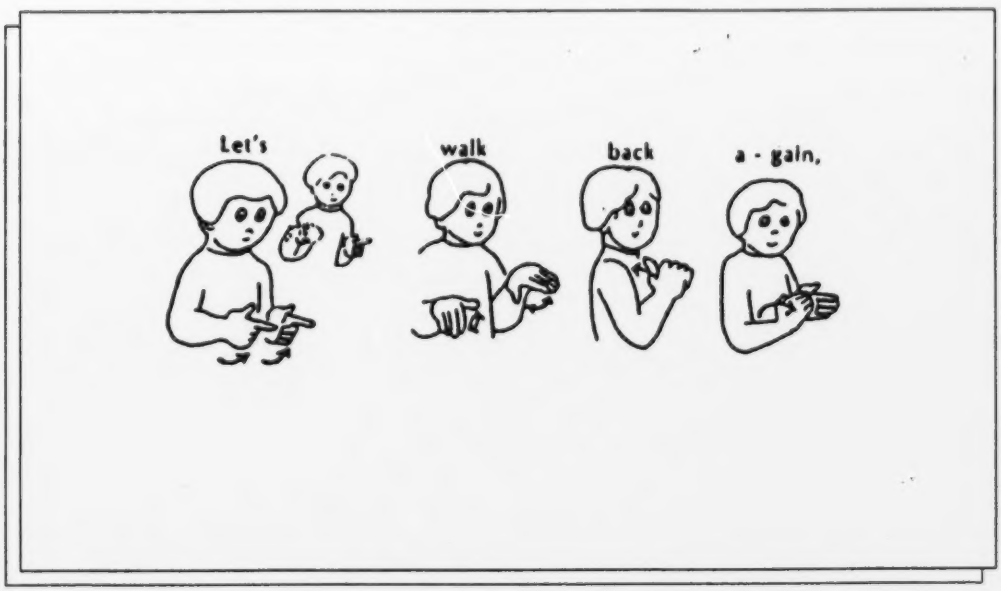


Figure 1 – Manual signing

- **Graphic symbols** – pictographic symbols that can be used by children who can perceive and attach meaning to two-dimensional representations (photographs [see Figure 2], pictures, and pictographic sets and systems [see Figure 3]). Many collections of graphic symbols are now available commercially. Most are pictographs designed to represent words/phrases needed by a certain group of children or adults (e.g., Picture Communication Symbols, Imaginart Symbols, Oakland Picture Dictionary). Some graphic symbols, such as Blissymbolics and Picsyms, actually belong to graphic language systems and have formal grammars and rules for combining and generating new symbols. See Appendix C for further explanation of graphic symbols.

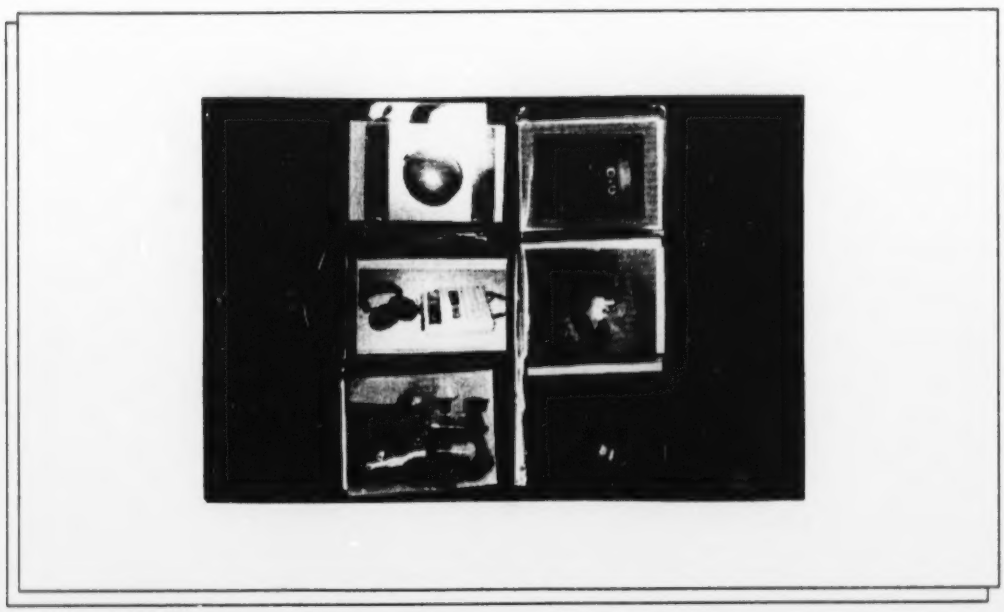


Figure 2 – Photographs placed under non-glare plastic covers

- **Tangible symbols** – three-dimensional symbols (i.e., objects, parts of objects, and textures) that are appropriate for children who are very young, have visual problems, or are dual sensory impaired (see Figure 4). They may also be useful for children who have difficulty attaching meaning to other forms of language representation.
- **Synthesized or digitized speech** – spoken words (English, Spanish, and so forth) produced by a computer.

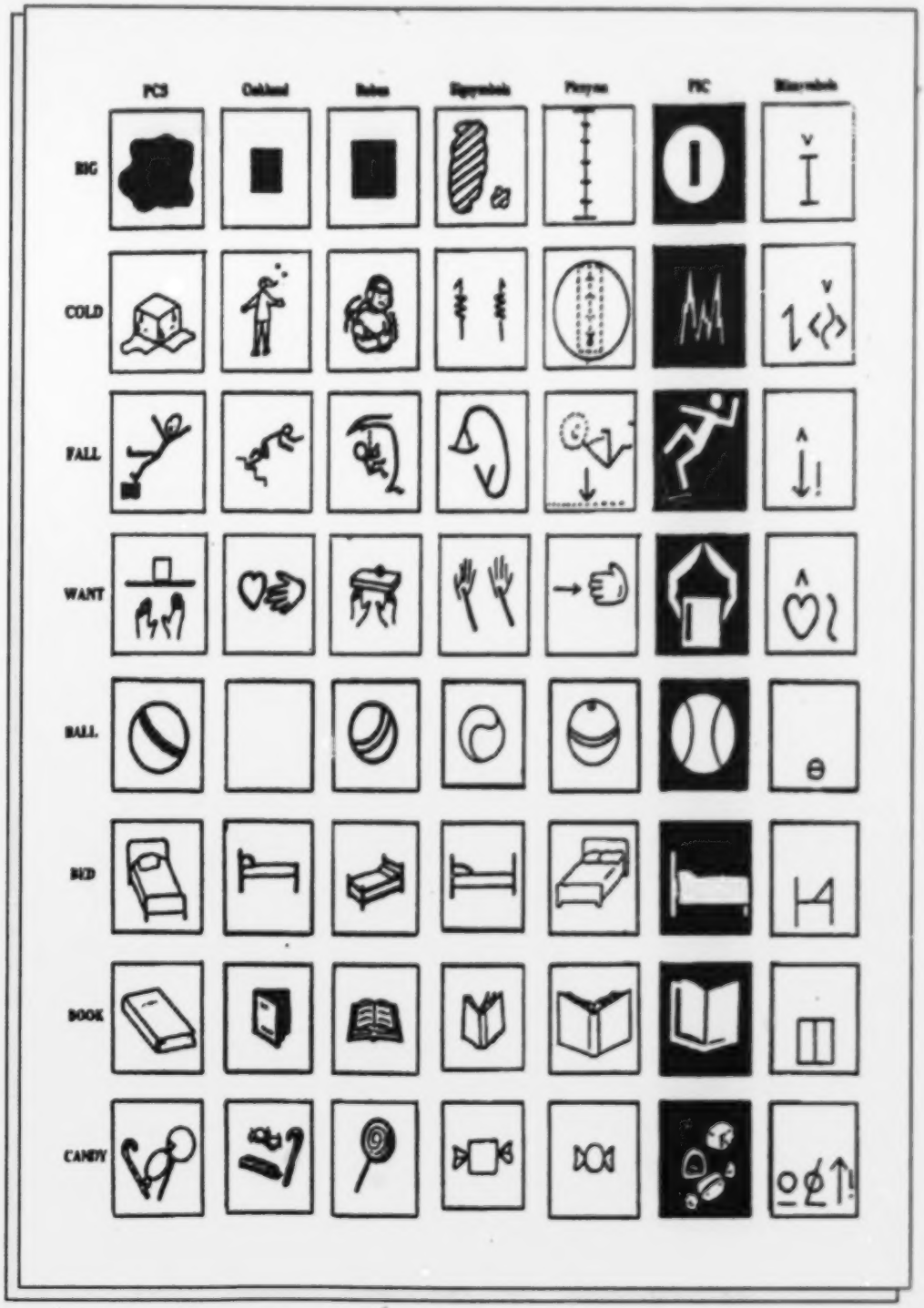


Figure 3 – Graphic symbols

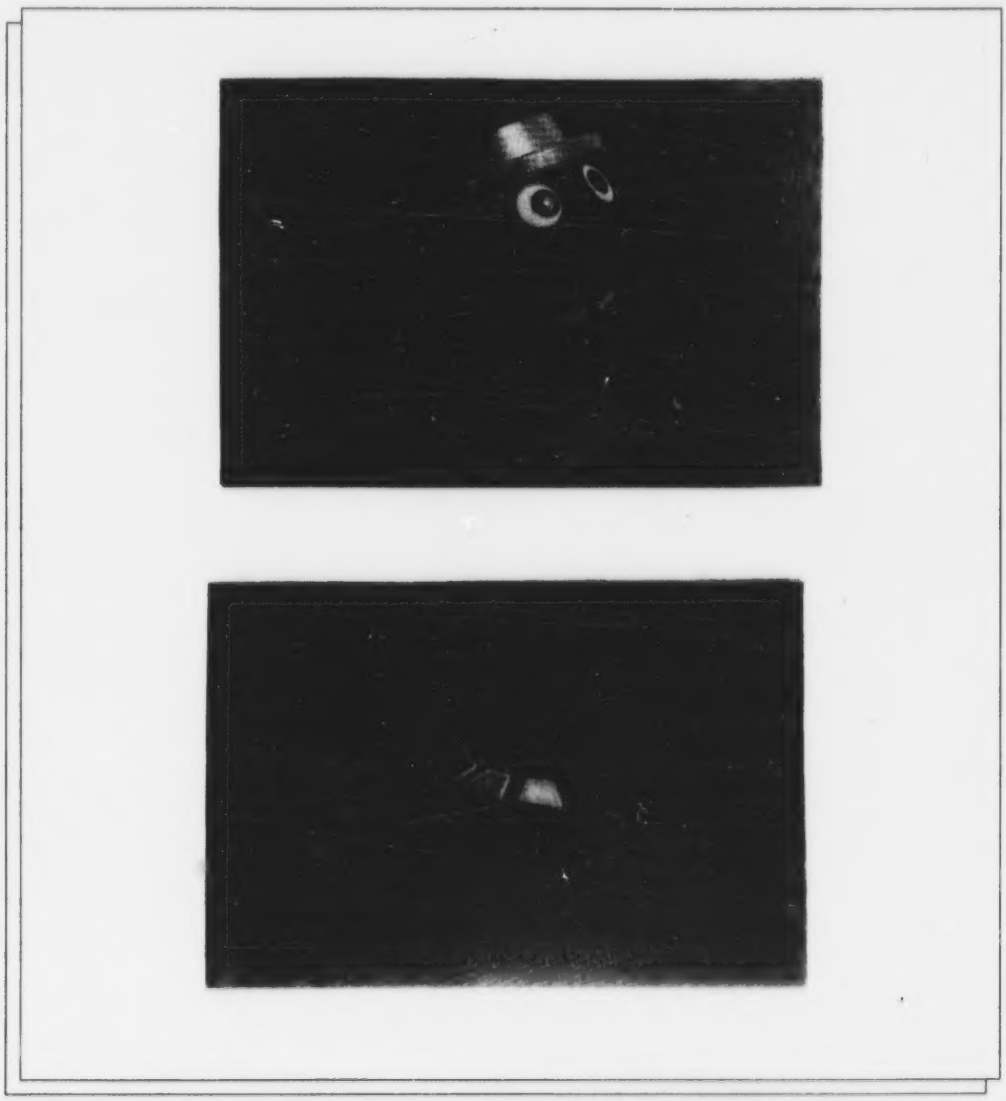


Figure 4 – Sample of tangible symbol

Communication Acts

Communication acts include everyday communication tasks that young children accomplish or might accomplish (e.g., indicating awareness of others, expressing preferences, establishing interaction, making choices, asking questions, refusing, rejecting, carrying on a conversation, achieving social closeness, writing, drawing, talking on the telephone, telling secrets, and so on).

Augmentative Communication Intervention

Augmentative communication intervention includes the process of assessing and teaching children *and their communication partners* to use a range of communication aids, techniques, and symbols. While interventions are not designed to "cure" or make a child "normal," they are designed to reduce children's disabilities and handicaps by providing tools and strategies that enable them to accomplish everyday tasks, albeit in a different way. Augmentative communication interventions stress functional outcomes. The most successful strategies are valued by the child, family, and community.

Benefits of Augmentative Communication

Professionals report that augmentative communication (AC) is used to facilitate the communication skills of very young children with cerebral palsy, Down syndrome, genetic anomalies, Williams syndrome, acquired disorders (e.g., those resulting from traumatic brain injury, drowning), degenerative conditions (e.g., muscular dystrophy), unspecified developmental disability, seizures, substance abuse effects, autism, tracheostomy, and others (Blackstone, 1990b). AC is now widely accepted as a viable treatment approach and has been shown to supplement and facilitate the development (or return) of speech, language, and communication skills, even for children previously not considered to have communication potential. The active involvement of AC teams, before and during preschool, provide children with more time to become familiar with a range of assistive technologies, techniques, and strategies and to develop functional language and communication skills.

Particularly pertinent to this module is the premise that communication is essential to each individual's life and that the early application of augmentative communication approaches may both facilitate the development of speech, language, and communication skills and prevent undesirable communication patterns from becoming established (Blackstone, 1990a).

Chapter III Intervention Framework

Intervention in the area of augmentative communication is often a life-long process for individuals with severe disabilities. This module focuses on the very beginnings of this dynamic process. While we highlight the young child, it is important to remember that young children grow up. As adults who share in their lives, our role is not to do everything for them. Rather, it is to provide children with communication opportunities and the necessary tools to enable them to participate and achieve. While we need to support and encourage them to do their very best, we must not decide what they can and cannot do. Our job is to ask good questions and provide opportunities, to understand how children learn and what helps them participate, and to encourage them to develop solutions that help them to communicate at home, at school, and in the community.

The intervention process can be broken down into phases of intervention that take into account the following:

- **Intervention is ongoing.** Young children develop and change and so do their communication needs and capabilities. Thus, the goals and mechanisms for achieving them change over time.
- **The intensity of services varies.** For example, professionals are more involved during assessment and training phases. They are less involved when children have developed skills that allow them to function independently.
- **The family, child, and community should gradually assume more responsibility for achieving goals.** Dependence on professionals should not be encouraged.
- **The communication intervention process should be built around a child's educational curriculum.** It should not stand alone as a separate curriculum.
- **Communication intervention should occur within "real life" environments and involve a child's family, teachers, and peers.** In other words, intervention needs to occur in real situations within a child's many living environments.

Figure 5 illustrates a four-phase communication intervention process that can be used as a framework for intervention within educational programs. This process is illustrated more fully in Table 1 on page 24. There are two characteristics of the process that are important to keep in mind:

- A collaborative team concept is central to successful intervention.
- A child is likely to be in different phasesof intervention *at the same time*. For example, a child may be assessed for the use of a communication device at the same time that he or she is using a language board in community settings without professional support.

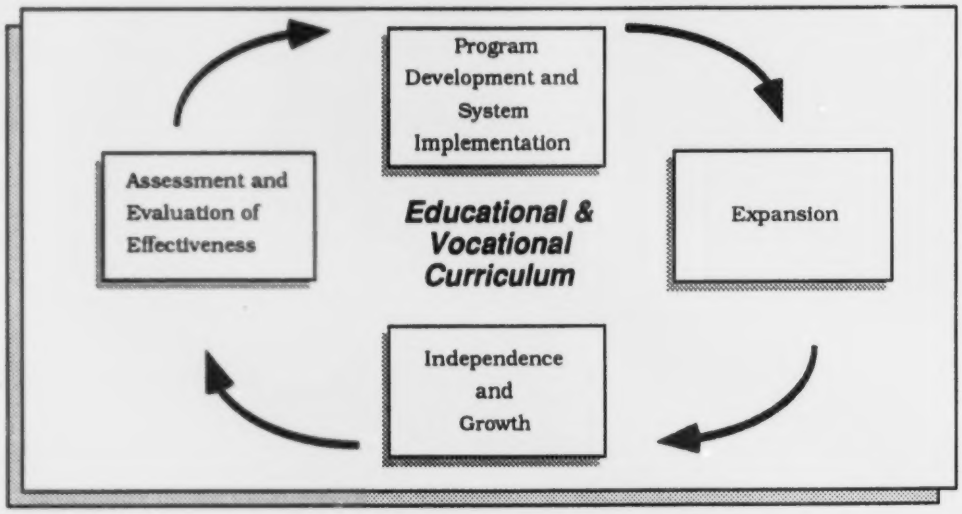


Figure 5 - Phases of intervention

How to Make It Happen!

We will explore each phase in more detail throughout this module. However, it is important to acknowledge first that professionals and families need to find ways to work together to accomplish their goals. Experience has shown that unless mechanisms are in place that ensure that assistive technology teams meet regularly, make plans, and work together, successful implementation does not occur in any setting. The underlying mechanisms (as described in this module) that "make it happen" are

- **team meetings** – Each student has a team, and these people need to meet periodically. Some teams have three members; most have many more. Team meetings should have an agenda and a time limit and should result in a written plan of action that everyone agrees to follow until the next team meeting.
- **action plans** – Action plans build in accountability. They tell team members who agrees to do what, by when, and how. Action plans can be the focus of team meetings. They provide a mechanism to evaluate what works and, just as importantly, what does not. Action plans are updated frequently (see Appendix D for an example).
- **participation plans** – Participation plans provide a map for each activity throughout the day. A participation plan includes a child's daily schedule of activities. In addition, it provides information about the level of participation expected of a child and the type of communication modes and technologies that need to be available during each activity. Finally, agreed upon strategies that should be used by the child, the facilitators, and the person(s) responsible for ensuring the child has opportunities to communicate during the activity are noted. Participation plans require that a curriculum be in place.

- **ongoing access to information and expertise** – Collaboration among agencies and professionals is essential. For some children who use augmentative communication techniques, a very specialized level of expertise is needed. Thus, school districts often develop relationships with professional centers that specialize in assistive technology. This gives staff the support they need to implement communication programs. One area that is always needed is technical support. It is foolish for teachers, parents, and clinicians to spend their time reading manuals to try and repair equipment when it breaks down. For this reason, many manufacturers of communication aids now have toll-free telephone numbers to provide technical support. However, on-site support is needed.

The mechanisms for "making it happen" described above have been used with considerable success in several school districts and have allowed many children with severe disabilities and communication impairments to attend and participate in regular education classes throughout the day.

Action plans and participation plans do not replace the child's Individualized Education Plan (IEP) or Individualized Family Service Plan (IFSP). They do, however, complement these documents. Let us now go into more detail in discussing the phases of intervention outlined in Figure 5 and Table 1.

Table 1. Framework for assistive technology intervention program

Phase of Intervention	Service Delivery	Goals	Mechanism for Achieving Goals
Assessment and Evaluation of Effectiveness	Intense, concentrated; multiple professionals & agencies involved	Delineate baseline function; establish initial goals & program plan, evaluate effectiveness of program over time	Initial screening/ assessments; team discussions & development of communication needs and initial action plan. Periodic evaluation of outcome
Program Development and Communication System Implementation	Intense, direct services; educational agency primary; specialized centers/ professionals with expertise needed	Further define goals & objectives; select assistive technology & develop operational skills; develop knowledge & skills of partner; implement program in specific settings	Frequent meetings to develop and implement communication program and its components: IEP/IFSP; action plans, participation plan, device specifications
Expansion	Decrease direct services; establish monitoring program in school, community, home	Increase level of independence; expand skills to new partners, activities, and contexts	Less frequent team meetings; revision of objectives and generation of action plans with increasing responsibility assumed by child, family, friends, & community
Independence and Growth	Monitoring of program with minimal direct service; family, child, & community play primary roles	Maintain or utilize skills with new partners & environments; accomplish more communication tasks independently	Team meetings, following along on the action plan every few months; yearly IEPs, IFSPs

Phase 1 Assessment and Evaluation of Effectiveness

For children who require assistive technology to communicate, assessment is an ongoing process. Initial assessments, no matter how complete, (as stated earlier) can only provide good baseline information and allow the team to make reasonable hypotheses about where and how to begin intervention. The goals of communication assessment are to enable the team to

- determine the current and future communication needs of the child and those interacting with him or her;
- identify the communication capabilities of the child and the child's partners as well as the characteristics of his or her environments and tasks;
- reach a consensus on communication goals and prioritize these goals;
- develop and revise plans that allow these goals to be implemented and that increase the child's involvement in activities and interactions; and
- monitor the success and/or failure of intervention approaches, including the use of assistive technology.

During the assessment phase, you need to learn about the child as well as the child's partners, communication contexts, and task requirements. What does the child do? What can the child do? What can't he or she do? How does he or she interact? How can communication be made easier? More effective? What do communication partners do that facilitates interaction? What interferes with it? What communication tasks does the child want and need to accomplish? Under what circumstances and with whom? What do family members, teachers, and other professionals want the child to do? Which communication technologies will enable the child to participate, interact, and learn?

Participants in the Assessment Process

The child, along with these people who know the child best, who are (or will be) working with the child, and those with special expertise in the area of augmentative communication, should take part in the initial assessment and subsequent intervention phases. At various times, the child's team may include

- **Children** – the best source of information, even when they do not seem to communicate. Watch, wait, listen, and learn what a child does in a variety of situations. Don't decide, for example, what a child can do with assistive technology without providing him or her with opportunities to use the technology. Young children will surprise you—if you let them. Let children tell you with their behavior who they are, what they prefer, and what they can do.
- **Family members** – can find out who the child wants to communicate with and can tell others about their child's interests. Family members often know how a child expresses hunger, anger, makes requests, says Hi, and so on. Most family members can and do interpret some of the child's vocalizations and nonverbal behaviors as meaningful.

- **Teachers** (both regular and special educators) – can decide which activities, materials, and curriculum will be used in their classroom. Teachers specify what kind of support they need from other specialists. Teachers manage the instructional assistants/classroom aides who are often responsible for adapting materials and assisting children throughout the day. Thus, teachers can help delineate the training needs of their staff, as well as help the family and staff identify ways to increase the child's opportunities to communicate and his or her active participation in the educational process. (For more detailed information about the role of educators, refer to the *Education Module*.)
- **Speech-language pathologists** – can assess the child's speech, language, and communication needs, skills, and abilities. Speech-language pathologists observe how communication partners interact with the child and help define the kinds of communication tools and adaptations the child may need to communicate. They conduct vocabulary inventories; select the types of signs, signals, and/or symbols a child uses; design communication displays; and identify the low- and high-tech devices for certain activities and various environments. They also look for ways to increase a child's opportunities to communicate, describe a child's attempts to communicate, and identify barriers that need to be removed. Speech-language pathologists often train children to operate technology and to communicate with peers, family members, teachers, and people in the community. They also focus on training the child's partners to facilitate interaction throughout the day. They are aware of the special needs of children with hearing, visual, motor, and cognitive impairments and work closely with specialists who can assist in the development of communication programs for children with severe disabilities (refer to the *Positioning, Access, and Mobility Module* as well as the *Listening and Hearing Supplement*).
- **Physical therapists and occupational therapists** – help others understand how to position the child for each activity so he or she can interact and function as independently as possible. These professionals describe a child's motor patterns and movement potential for activating/manipulating toys, appliances, communication devices, and computers. They address movement and mobility issues, both assisted and independent. It is important to realize mobility aids allow children to explore the world. Thus, they can help children develop concepts, language, and a sense of control. Wheelchairs should be thought of as communication as well as mobility devices because they expand children's access to partners and their opportunities for interaction and independence. (See the *Positioning, Access, and Mobility Module* for a more complete discussion of mobility devices.)
- **Instructional assistants/classroom aides** – are critical to the intervention process and should be included in all discussions. They provide helpful information about how the child uses signals, interacts with peers, and so forth. They need to learn how to set up and modify activities, and must be familiar with the child, teacher, all professionals involved, and classroom routine. They are often responsible for positioning, feeding, using the toilet, and so forth.

Instructional assistants (like everyone else) need to promote the independence of young children rather than their dependence.

In addition, rehabilitation engineers, audiologists, vision specialists, psychologists, nurses, doctors, day care personnel and others often are involved, as needed.

As discussed, the intervention team consists of the child, the family, and a group of professionals who are experienced in the application of assistive technology and who either work directly with the child or are responsible for guiding and implementing elements of the child's program. Augmentative communication teams are not born, they are made. In fact, the process of developing any team that works efficiently and effectively in educational settings is not an easy accomplishment. To do so, team members need administrative support and mechanisms that allow them to work together to accomplish goals. Teams should meet on a regular basis, with the frequency of meetings determined by how firmly established the intervention program is and how complicated or changeable the child or situation is. Some teams meet every 2 weeks, whereas others meet every 2 to 3 months. During the assessment phase of intervention, however, meetings should occur often.

Examples of the Assessment Process

The following examples illustrate the involvement of a school district's augmentative team with two young girls.

- E., age 4 when originally assessed by the team, rarely vocalized or used intentional gestures. She enjoyed interaction and showed preferences for familiar adults. Assessment data revealed that she had normal vision and hearing. She had severe cognitive impairment and functioned well below a 12-month developmental level, with most behaviors exhibited at a sensory motor stage 4 (Uzgiris-Hunt). Her play was characterized by mouthing and occasional visual or tactile exploration. She used few objects (i.e., cup) meaningfully. Minimal interactive and no representational play was observed. She responded inconsistently to her name and changes in a partner's voice inflection. She had severe speech motor problems. Vocalizations were rare and no consonants were observed or reported. Drooling was significant. Chewing and swallowing were primitive and sensory deficits in the oral-facial area were suspected. Other motoric patterns were described as ataxic. She crawled and could climb onto large chairs; she did not walk without assistance.

  At the time of the initial assessment, E. was attending a special preschool class for children with severe disabilities. Her IEP goals for communication were to use picture symbols and signs to request food, although she did not appear to attach meaning to either symbols or signs. Her communication partners were "motoring her through" communication tasks, and she was resisting. Food was the only reinforcer identified. Hair-pulling was a problem. Minimal progress had been reported since the beginning of the previous school year.

  Family members were concerned about E.'s lack of speech, her inappropriate behaviors, and the methods being used to train her (i.e., they felt the constant verbal and physical prompting was obtrusive). During the assessment phase of

intervention, team meetings were held every month. Team members included her family, classroom teacher, speech-language pathologist, occupational therapist, physical therapist, and a district program supervisor.

- A., a 5-year-old girl unable to walk or talk, has always had a twinkle in her eye. Her diagnosis was severe spastic quadriparesis and dysarthria, secondary to mixed cerebral palsy. Data suggested normal intelligence and normal hearing. Visual acuity was corrected by glasses. Her receptive language profile was within normal limits, but expression was limited to facial and body gestures, vocalizations, and a communication board containing approximately 25 symbols which she accessed with great difficulty by sliding her arm along her tray. She was dependent on others for eating, using the toilet, mobility, and communication.

  Enrolled in a regular education class, her interaction with peers was quite limited. They tended to treat her as a younger child. There was a computer in the classroom with some software, but she could not access it. She had a manual wheelchair and a variety of positioning devices (standing table, toilet chair).

  During the initial assessment period, consultants, the family, and district personnel comprised the team. Today, her team has grown to include professionals at a rehabilitation engineering center, community computer program, the local university, and manufacturers of assistive technologies and their representatives.The dynamics of a regular education curriculum and the amount of technology (both electronic and nonelectronic) that A. needs to use require considerable coordination, ongoing evaluation, and frequent modifications and adjustments.

Assessment Variables

To assess communication, you need to consider variables that relate to the child, the context (including partners, places, and situations), the communication task, and the type of augmentative components being used (communication aids, techniques, symbols, and strategies). These variables are interrelated (i.e., if change occurs in a child, it will almost certainly affect the partners and the communication components they use). Similarly, if change occurs in the tasks a child is expected to accomplish, a new approach to communication may be required. Let's take a look at each of the assessment variables affecting communication intervention in more depth.

Child

The needs, capabilities, and personal preferences of each child must be determined.

- **Needs assessment** – Consider the child's needs from the perspective of the child, as well as from the perspective of the child's primary communication partners and his or her daily activities.

- **Capabilities and skills of the child** – Consider vision, hearing, gross and fine motor coordination, seating, mobility, reliability of movements, motor-speech skills, cognitive profile, language profile, academic skills, activities of daily living, social skills, and behavioral patterns.
- **Personal goals and preferences** – Consider with whom, when, where, and why the child currently communicates.

Communication Context/Environment

The activity requirements must be delineated and the characteristics of the context that affect interaction must be described.

- **Partners** – Consider the available time, expertise, and characteristics (cognition, language, sensory and physical constraints, interaction patterns) of the child's primary and potential partners.
- **Social contexts** – Define contexts within which the individual needs to interact and the social requirements of the environment. For example, after school, E. goes to a day-care program. She must have a way to communicate in the community when she is taken for a walk or to the local shopping center.
- **Community resources** – Describe attitudes of familiar and unfamiliar partners; financial resources for equipment purchase, maintenance, and supportive services; availability of professional services; acceptance within the community.
- **Physical contexts** – Consider where interaction takes place and the physical orientation and proximity of partners. Describe mobility requirements, accessibility of places and materials, lighting, access to electrical outlets, and evaluate the acoustic environment.

Communication Task

A task analysis of daily activities and communication requirements must be completed. Consider the need for

- **social closeness** – touching, playing, establishing joint attention, chatting, participation in activities, jokes, games. This is important for all children and does not necessarily require technology.
- **quick and recurrent messages** – rejecting, refusing, indicating excitement, requesting, greeting, responding, using familiar sayings and routines, songs.
- **conversation** – gaining attention, taking turns, maintaining attention, and if language skills are present, establishing and maintaining topics, using conversational repair strategies, and engaging in communication across distances (telephone conversations).
- **participation in curriculum** – answering questions, following directions, requesting materials, taking part in activities/discussions, completing assignments.

- **writing/drawing** – copying, tracing, sketching, scribbling, typing, writing. For example, A. could not do any of these activities without technology. With it, she can do all of them.

Augmentative Communication Aids, Symbols, Techniques, and Strategies

Begin thinking about what gestures, vocalizations, communication displays (symbols and vocabulary), devices, means of accessing equipment, and communication strategies a child can use to accomplish communication tasks (e.g., communication board during snack, a speech output device during circle time, and so on). Communication intervention for both A. and E. began with their existing communication systems, which the team observed during the initial assessment period, and has gradually expanded to include a variety of special augmentative options.

Assessment Tools

Communication assessment, which takes place in more than one environment,* should include the following actions:

- *Record general observations.* Always observe the child and his or her partners communicating in real situations. Focus on what they can do. (Remember, what you see [or don't see] is influenced by your own previous experiences and where and with whom you observe the child.) If you are just getting started, ask someone with more experience to help you interpret what you see. It is often helpful to make a videotape of the child engaged in several activities. The videotape can then be viewed at a later date (alone or with someone more experienced). Videotapes can provide important baseline information about the child's opportunities to communicate, how he or she participates in activities, how successful he or she is when attempting to communicate, the types of communication modes the child uses, and so on.
- *Complete checklists or other criterion-based instruments.* A task analysis, communication needs assessment, interaction checklist, and other observation tools are commonly used. See Appendix E, Interaction Profile, and Appendix F, Communication Skills Inventory, for examples of available communication assessment tools.
- *Interview primary care providers.* Determine how partners perceive the child and the child's attempts to communicate. Find out what care providers' expectations are for the child. Discuss their role on the team and their expectations of the team.

* For young children, it is strongly recommended that at least some portion of the assessment occur in the home.

- *Review educational and medical records.* Make sure you understand relevant diagnoses and be certain that information about the child's sensory and motor systems is documented and up to date. If psychological or language testing has been done, carefully read how it was accomplished. If you don't understand the terminology, have any questions about the reliability or validity of these data, or wonder what the implications are, do ask!
- *Refer student to other professionals/agencies for answers.* If possible, be aware of the child's visual, hearing, motor, and cognitive status prior to beginning the communication assessment. Keep an open mind and ask questions of appropriate professionals. Try to share the information you observe about the child with others.
- *Administer tests.* Motor, sensory, cognitive and/or behavioral problems often make test administration difficult. However, with procedural modifications (e.g., no time limits), you can obtain valuable information about a child's language comprehension as well as his or her cognitive, articulation, and communication skills. Make sure you know that a test is psychometrically sound and that you understand what a test measures *before* you take the time and trouble to modify or administer it. Tests are wonderful tools, but only in the hands of a good diagnostician. Interpret the results carefully.

Assessment instruments can be modified for children with physical impairments by spatially rearranging test stimuli in a way that enables them to respond. For example, you can cut apart pictures on the Peabody Picture Vocabulary Test (PPVT) or the Assessment of Children's Language Comprehension (ACLC) and place them at each corner of an Etran (a clear plexiglass frame). The individual can then respond by looking at the picture. Remember, standardized tests must be interpreted with caution if you make *any* modifications to specified procedures.

Assessment Process

Step 1: Identify current and future communication needs across contexts and partners.

Interviews with people who live and work with the child, as well as observations, can help you determine if communication needs are being met and under what circumstances. During interviews, ask which needs are being met all of the time, some of the time, or none of the time. It is also helpful to ask family members, teachers, and clinicians to prioritize a child's needs.

Team meetings can be used to identify and prioritize communication needs. One approach, which is based on a brainstorming technique called storyboarding, is described as follows.

Storyboarding

Materials needed include: 5" x 7" cards (approximately 5 per person); black magic markers (1 per person); 1/2" brightly colored sticky dots (3 per person); a large cork board (with pins), blackboard, or other surface (with tape) to display cards.

1. The facilitator asks each team member to write down what he or she thinks are the child's most important unmet communication needs. Everyone is given 5 minutes to complete the task. They must write legibly, and include just one idea on each card. They are encouraged to work independently.
2. As everyone writes, the facilitator collects the completed cards and displays them on a cork board (using pins) or on a blackboard/wall (using tape).
3. When putting up the cards, the facilitator attempts to group them by category (e.g., basic needs, interaction/social closeness, conversation, writing, academic achievement, making friends, play, and so forth).
4. When the time is up, the facilitator collects the rest of the cards and spends the next few minutes going over the rest of the cards with the group. The group decides where to put each card and to discard ideas that have already been represented on the board.
5. When all ideas about a child's, communication needs have been displayed, the facilitator asks participants to decide which three goals are most important. The team is told that during a break (or after the team meeting) they should come to the display and put their 3 dots on the cards they feel should receive top priority.
6. When everyone has finished, the team's priorities for the child are obvious. The facilitator assists the team in using this information when setting goals.

Although developed during the initial assessment process, the list of communication needs can be used to assess progress over time and should be updated at least yearly. As such, it becomes a built-in method for evaluating the effectiveness of the communication program.

The list of needs can also be a permanent part of the student's action plans. See Figure 6 for an example of E.'s initial needs on her action plan.

STUDENT'S NEEDS (Identified and Prioritized) ACTION PLAN

*Number of people on team who consider this item a need.

Communicate basic needs and express internal state (tired, hurt, etc.) - 9*
Make choices - 4
A word/symbol for Daddy - 3
Basic needs: food, drink, potty - 2
Explore her environment, play with toys - 2
Social interaction with peers (turntaking and turngiving) - 2
Get attention - 1
Clap hands - 1
Express feelings - 1
Involve others in play activity - 1
Express likes and dislikes consistently - 1
Respond to questions (e.g., Do you want cookies?) - 1

Summary of accomplished objectives:

TEAM MEMBERS *attended meeting

Issues:

PLAN	WHO	WHEN	HOW MEASURED	STATUS
GOAL #1:				
Objective #1				
Objective #2				

Figure 6 – Example of communication needs on an action plan

Step 2: Collect pertinent data.

Questions to consider when assessing the child's skills and abilities are summarized in Table 2 below. Please refer to Appendix G for a step–by–step example of a protocol that can be used to address these questions and assess a child for possible augmentative communication intervention.

Table 2. Considerations when assessing current and future communication needs

Qestions	Professionals who can help	Current and future impact on communication
Does child have sensory deficits?	Audiologist, teachers of hearing/visually impaired, occupational therapist, ophthalmologist, optometrist	Even minor deficits can interfere with learning, opportunities for interaction, access to technology
Does child have perceptual deficits?	Occupational therapist, teachers of hearing/visually impaired, audiologist, ophtalmologist, optometrist	Affect use of AC symbols, devices & techniques, reduce or even preclude progress
Does child have motor problems?	Occupational therapist, physical therapist, rehabilitation engineer	Interfere with positioning for learning and communication, preclude access to equipment, preclude independence, may reduce opportunities for interaction and create "learned helplessness"
How does child learn? What are child's current communication skills? What is child's language profile? Why does child have trouble speaking?	Speech–language pathologist, psychologist (cognitive & behavioral), regular and special educator, resource specialist, audiologist	Interfere with development of all skill areas, result in teachers' use of inappropriate teaching methods, can cause significant behavior and learning problems and can affect child's development of self-esteem

Step 3: Collect pertinent data about the environment (e.g., communication partners, expectations of interactants, physical layout, constraints of the setting, and the communication tasks that are required).

(For further information about a process for assessing a child's functioning in all learning environments [home, school, and community], also see the *Education Module.*)

Does the child have opportunities to participate in activities and to communicate?

Where do the activities occur? When do they occur? Who is present? What activities could the child participate in more fully and independently if some form of assistive technology, task modifications, and/or support were available? Through interviews and observation, examine activities the child is involved in and determine if, and under what circumstances, partners provide opportunities for the child to communicate. Then, determine how actively the child could/should participate. Are modifications needed to the activity or materials? Do adults and other children need to alter their expectations? Are sufficient opportunities provided?

For example, because of A.'s severe physical challenges, she had been precluded from participation in most activities, despite the efforts of her peers and teachers. Fortunately, teachers were able to read some of her signals and gave her opportunities to take turns and participate whenever possible. However, without access to appropriate technology (and therefore language), her ability to participate remained severely constrained.

What are the child's positioning needs for each activity?

Stable positioning for communication and access to assistive technology (e.g., communication boards, devices, computers) is critical for children with significant physical disabilities. There are also many ambulatory children with motor planning or visual problems whose needs should be addressed by physical and/or occupational therapists. (For a discussion of the range of possible positions and their respective technologies, see the *Positioning, Access, and Mobility Module.*)

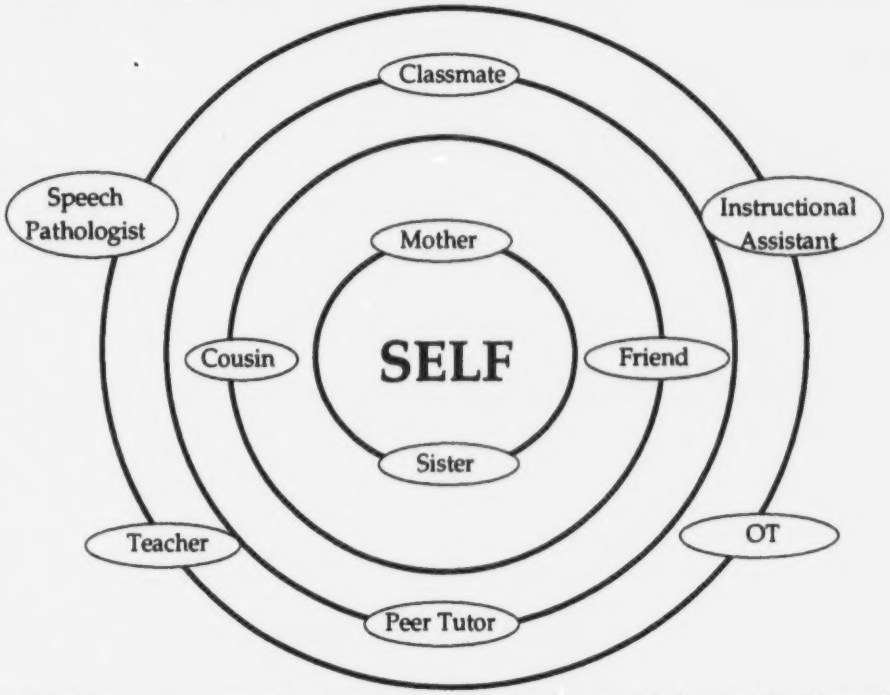
What are the attitudes and expectations of family members and professionals?

It is important to know what partners think and feel about communication and augmentative intervention *beforehand* or valuable time can be wasted. Appendix H has a sample protocol that can be used to assess the attitudes of family members and other care providers, and Appendix I has a sample protocol that can be used to assess the attitudes of the child if he or she is able to participate.

It is important for a child to have friends and acquaintances with whom to communicate. It is also necessary for partners to be trained to facilitate a child's attempts at communication. Therefore, we must find ways to identify people in a child's life who are currently or could be communication partners. As modified from Forest's Circle of Partners, Figure 7 illustrates a child's circle of communication partners. The inner circle represents a child's core relationships. A.'s and E.'s

inner circles are each comprised of their mother and father. The second circle contains a child's good friends (i.e., people they trust and with whom they want to share time, thoughts, feelings, and ideas). These relationships are heavily dependent on communication and are often empty for children with severe communication impairments. Both A. and E. had classmates they particularly favored, but neither had ever been invited to a birthday party, to play at a friend's house after school, or to spend the night at a friend's home. The third circle of communication partners is for favorite acquaintances (e.g., babysitter, neighbor, mailman, shopkeeper). This circle reflects the advantages of independent mobility as well as communication skills. Because very young children are closely supervised, they do not have many people in their third circle. However, most school-age children know a large number of people from their neighborhood, school, and community experiences. Finally, in the outer circle are people who get paid to have a relationship with the child (e.g., clinicians, doctors, teachers, and aides). Both A. and E. initially had more communication partners in their outer circles than all other circles combined in direct contrast to other children, whose second and third circles are generally more filled. Perhaps one of the most important goals of any communication intervention program for children with disabilities is to establish a balance among their circles.

(Adapted from May's Map, With a little help from my friends: A videotape by M. Forest & J. Snow. Expectations Unlimited, P.O.Box 655, Niwot, CO 80544)



From S. Blackstone (1991). *Augmentative Communication News*, 4(2), Monterey, CA: Augmentative Communication, Inc.

Figure 7 – Circle of communication partners

Constructing a Circle of Communication Partners for a child provides valuable assessment information, can be useful in selecting partners for training, can help a team keep track of who is (and who is not) trained over time, and can be useful to share with other older children as a basis for discussion. In addition, updating a child's circles on a yearly basis provides the team with a built-in measure of effectiveness.

Step 4: Select signals the child uses/could use to develop a broad-based foundation for communication.

What signals does (or could) the child use?

Skills in turn-taking, joint attending, and using people as agents underlie communication and language. Therefore, early expression of these behaviors are nonsymbolic (i.e., gestures, vocalizations, and body language are used). Basic communication skills are acquired gradually. For example, a young infant's cry may initially be only a response to hunger, but may be interpreted by the care provider as an intentional request for food. Later, these nonsymbolic signals are augmented by the appearance of symbolic forms, resulting in the eventual integration of a communication system comprised of multiple modalities.

Intervention always begins by identifying the natural gestures and vocalizations a child uses in a variety of natural contexts that either are, or could be, communicative. Appendix J illustrates the Communication Signal Inventory for a little boy with severe physical impairments. Parents fill this out to assist the team in identifying and responding to a child's signals. For children who do not appear to "signal," a repertoire can be developed using the assessment form in Appendix K, Identifying Signaling Behaviors (Carlson, Hough, Lippert & Young, 1988). The goal with young children is the development of natural speech and language; however, if this does not occur, a strong foundation for communication can be built using nonsymbolic signals.

What symbol set/systems should the child use to represent vocabulary?

Selection of symbols should not be based on what happens to be available in the program. Symbols should be selected on the basis of what language forms will be most useful to a child and will enable her or him to communicate with others in the classroom, playground, community, home, and so on. Unfortunately, there are no easy answers or tests that tell us which kind of symbols to use with a particular child. Thus, decisions are best made by persons who are familiar with available symbol sets and systems, language development, and the child.

- As a guideline, consider *real objects or photographs* for children who are just beginning to understand symbolic communication, have dual sensory impairments, or have visual impairments. Pamela Mathy-Laikko (as reported in Blackstone, 1988) demonstrated that children with severe cognitive disabilities and dual sensory impairment (functioning well below 1 year developmentally) can, after systematic training, attach meaning to abstractly textured symbols and use them to make requests.

- *Graphic symbols* offer more flexibility and greater access to vocabulary than objects or textures.
- *Intelligible synthesized and digitized speech* can be used in conjunction with tangible and graphic symbols, greatly expanding children's communication opportunities, increasing the power of their communication acts, and often enhancing their communication partners' perception of the children's communication competence.
- Many young children, including those with severe physical impairments affecting upper extremity use, learn to use a few *manual signs* as symbols (e.g., eat, drink, go). Although very useful for young children, signs are often not intelligible to unfamiliar partners. Thus, as children grow up, signs ultimately restrict their communication options.

To summarize, the child should be able to attach meaning to the symbols that are selected and the symbols should be recognizable by the child's partners. To help specialists select symbols, you will need to give them information about the child's cognitive and language abilities, visual and auditory acuity, and discrimination abilities, as well as the capabilities of the child's primary partners. Watching children play and determining what they pay attention to can help specialists select initial symbol sets for further evaluation. Remember that symbols carry meaning (i.e., they stand for something else). We cannot assume that a child knows what a symbol "means" or how to "use" it. Most children need to be taught! We also cannot assume that a child knows the communication value of a symbol until he or she uses it spontaneously to communicate with others in more than one situation.

Step 5: Conduct vocabulary inventories.

What language does the child need to express?

Vocabulary should be child-centered, selected for multiple environments, focused on communication rather than language, and flexible. Selecting an initial vocabulary should take into account the following:

- What will motivate the child to communicate?
- What will motivate the child to use language?
- What will give the child the ability to make choices?
- What will increase the child's ability to interact with more people (other children, family members)?
- What important objects/events/people in the child's world does he or she need to attach meaning to?
- What will increase communication rate (includes phrases/sentences)?
- What will increase initiation of interaction and the child's involvement in "conversations?"
- What will provide age-appropriate personal expression ("let's go, go, go!")?
- What will help the child express novel ideas and thoughts?

Children need to do more than label objects (e.g., *ball, cracker*) or request things (e.g., *eat, drink*). However, words that describe actions (*go, whee*) and express states of being (*yucky*) as well as vocabulary used by the child's peer group (e.g., names of the Teenage Mutant Ninja Turtles) are important. Consider also selecting generic, rather than specific, vocabulary (*more, some, this, that, here, there*) for children with adequate cognitive capabilities. These words can provide more opportunities to use language.

Clinicians report using a variety of approaches to select vocabulary (Blackstone, 1988), such as

- conducting structured, face-to-face interviews with care providers;
- conducting structured interviews with the individual child (for older children and adults);
- directly observing the child in a natural context/role-playing activity;
- reviewing vocabulary from available source lists (i.e., words frequently used by certain groups);
- asking care providers to complete a questionnaire;
- observing children with speech doing the same activity;
- asking care providers to maintain a communication diary;
- asking care providers to prepare a list of needed vocabulary;
- asking the child to select his or her own symbols;
- observing the vocabulary that care providers use to stimulate the child via symbols on a communication display (i.e., aided language stimulation) and/or by developing scripts;
- reviewing previous records; and
- conducting a formal environmental inventory.

Interviews with care providers, direct observations, and source lists are often used in conjunction with one another. One recent study showed that family members preferred to use source lists rather than to generate their own list of vocabulary, and that speech-language pathologists and teachers generated words not included on the family member's lists. Vocabulary selection is ongoing and is always a dynamic process. Ideally, multiple sources should contribute to a child's vocabulary, and the words a child has access to should grow and change on an almost daily basis.

Step 6: Summarize information and generate a plan of action.

The final step in Phase I is to generate an initial plan of action after assessment information is summarized, shared, and discussed. The action plan allows the team to reach a consensus about what to do next. Appendix L has an example of E.'s initial action plan. The action plan includes a list of team members to enable easy communication among team members. In addition, a summary of progress and a list of issues that concern team members can be noted on each plan. Goals and

objectives are listed, together with who is responsible for carrying out the objectives within a specific time frame. The team also determines how to evaluate if/when each objective is met. Please note that objectives are written for the professionals/parents, not for the child, as in an IEP or IFSP. An action plan lays out the process that those involved will follow to make sure the program is carried out. It is a means of reminding people what they have to do and it provides a productive structure for team meetings. Action plans are generated as often as once a month. Assistive technology teams rate action plans as one of their most useful tools.

At the end of Phase I, the team should know a great deal about the child, the family, and their communication behaviors in various contexts and activities. They should have discussed and decided upon some signals, vocabulary and symbols, and have begun to consider strategies to improve communication as well as various assistive technologies that can enhance the child's communication. Keep in mind that intervention generally begins even though many questions remain unanswered. Over time, the team will understand more about the child, how he or she learns and communicates. Again, assessment begins but never really ends because young children and their situations are changing all the time. Thus, as each communication strategy, device, or technique is introduced, it should be evaluated. That's part of the ongoing assessment process.

Several strategies for evaluating the effectiveness of communication intervention with an individual child were discussed, including using action plans, updating a child's communication needs, and updating the circle of communication partners. In addition, it is advisable to assess a program's effectiveness by asking the parents and professionals involved whether they are satisfied with the services provided and what changes they suggest to improve the quality of the program. An example of such a tool is contained in Appendix M, "Consumer Satisfaction Questionnaire."

Phase 2 Program Development and Communication System Implementation

This phase of intervention focuses on the implementation of all aspects of an individual's communication system, including the selection and training of assistive technology.

Step 1: Establish and prioritize goals (short- and long-term).

There are only so many hours in a day and only so much that can be accomplished. To get anything done, therefore, it is essential that goals be prioritized. The following issues should be considered.

- **Therapeutic versus educational goals** – Young children with disabilities have both therapeutic and educational goals. In either case, short- and long-term goals should be discussed and prioritized. Time is a reality and there are rarely enough hours in a day for a child to complete assignments, go to occupational and physical therapy, play, learn symbols on a communication display, practice interaction skills, go to the bathroom, eat, change positions, rest, learn, or sleep!
- **Teachers cannot teach students who are not in their classroom** – Communication services should be provided in classrooms and in the other school contexts in which children communicate. Priorities need to be set and agreed upon so that children can participate in their curriculum and feel a sense of accomplishment. That is a major reason to generate action plans. Short-term goals that are given priority should have a functional impact on the child's ability to communicate and have a high probability of success. Long-term goals and plans that enable professionals and families to explore a child's learning style and potential should also be addressed.
- **Academic versus social versus life skill goals** – Some are concerned that speech-language pathologists and others have placed too much emphasis on teaching children to express basic needs and develop conversational strategies and too little emphasis on participation in activities and achievement in school, home, and community. The child who is able to actively participate in each school activity and who can interact with peers is more likely to learn and communicate. We must be careful to balance intervention oriented toward development with intervention oriented toward function.
- **Interdependence and independence** – When to help and when to challenge? Both are important. Those who work with young children with disabilities must be careful not to foster dependence. Technology partially solves this problem. However, it is often a challenge to make professionals and family members aware of (and change) their own behaviors. Most are inclined to treat young children with handicaps as infants. However, research shows that interaction increases when professionals move away from the child. Adults should be encouraged to set students up for an activity and to walk away, not

hover around them. This not only helps the student, but enables the adult to do other things (e.g., prepare materials for the next lesson, work with other children, program the device for tomorrow's circle time, and so forth).

Step 1 includes the development of a young child's educational plan (IEP or IFSP). It is recommended that speech, language, and communication goals be infused into educational goals across domains rather than isolated in a separate "communication section." A developmental approach (i.e., cognitive, fine motor, gross motor, language, self-help social/emotional) tends to divide children into parts. It is not as functional (or effective) as a "life domain" approach or an approach that specifies desired outcomes for a family.

An example follows. E.'s communication goals were incorporated in her IEP under the recreational/play, academic, community, and domestic domains.

- Child will demonstrate an understanding of real objects/pictographic symbols and use them to depict her daily schedule (e.g., circle time, painting, snack, outside, computer time, exercises)—*academic domain.*
- Child will use objects to make requests at home and in school during play activities—*recreational/play domain.*
- Child will increase the quantity and quality of vocalizations (e.g., to get attention) across domains—*all domains.*
- Child will use gestures to express rejection ("no"), to request objects/people/events, to denote pleasure/affirmation ("yes"), and to request information during community outings—*all domains.*
- Child will demonstrate understanding of pictures or pictographic language symbols in targeted contexts at school or home—*academic domain.*
- Child will use signs to make requests and comments to mother, teacher, and instructional assistant—*all domains.*
- The number of partners with whom the child interacts at school, home, and in the community will double—*all domains.*

An example of how A.'s IEP was written is provided in Appendix N. Her IEP illustrates the use of life domains: academic, recreational, domestic, community, and personal. Also exemplified is the involvement of a team, the use of action plans, and how assistive technology is written in as an integral part of the student's educational plan.

Step 2: Consider specific assistive technologies as tools to meet communication needs and to increase the child's active participation.

Prior to recommending assistive technology for an individual child, issues that must be considered include not only the child's abilities and needs, but also the

- features of devices;
- acceptability to child and family;
- cost, including repair and maintenance;

- funding availability for devices and services;
- durability;
- intelligibility;
- ease of use,
- compatibility with mobility and other activities;
- effect on motor skills, body posture, fatigue;
- portability;
- training requirements;
- programmability (ease with which a device can be programmed); and
- aesthetics.

Selecting the "best" assistive devices for any child requires that professionals be aware of what is available and what the child needs, as well as the abilities of the child and the child's care providers. For example, over 50 electronic communication devices are available commercially (see Appendix B for examples). Each has different features and characteristics. In addition, there are many kinds of nonelectronic devices and techniques that play a major role in communication intervention with young children. Just keeping up to date on available technology is difficult, even for specialists who attend conferences, spend time at exhibits, consult the 1990 Wall Chart of Communication Aids (Kraat, Sitver-Kogut), and maintain contact with major manufacturers/distributors and technology assessment centers. See Appendix O for lists of manufacturers/vendors and print resources (valuable for one's own library). Following are some examples of communication aids and devices which are also illustrated in Figure 8.

Environmental displays and devices

Symbol displays placed in the environment (a) enable children to access language and (b) enable adults to model the use of symbols in natural contexts. Displays may be single pictures or displays mounted on the wall/cabinet/refrigerator, or displays/devices placed in a special area of the room. Children have access to the displays when they are engaged in the targeted activities. Tape recorders with loop tapes, Language Masters, buzzers, as well as communication aids can be used. Following are examples of displays/devices in use:

- A 2-year-old with cerebral palsy is in the bathtub with symbols on walls.
- A 3-year-old is using a loop tape recorder to greet her classmates. A loop tape is a 10-20 second continuous tape similar to tapes used in answering machines. Any message can be recorded on it.
- A 4-year-old is pointing to a symbol for "question" on the wall and vocalizing to call the teacher from across the room (i.e., "I have a question").
- A 5-year-old child is taking a message (that has been placed on a Language Master card) from a table and putting it through the Language Master to ask for a drink.

- A 5-year-old is using a calendar box to mark the end of one activity and select the next.
- A 7-year-old is exchanging a picture of a cup for a drink.

Portable communication aids

Devices that accompany the child may be attached to the wheelchair or carried/pushed by the child who is ambulatory. Examples of portable devices in use are

- a 2-year-old and mom playing house using a digitized speech aid,
- a 4-year-old using an Etran with a speaking peer,
- a 5-year-old in a wheelchair using a scanning device with a single switch to respond in class,
- a 5-year-old with a communication wallet ordering at McDonald's,
- a 6-year-old with a visual impairment using tangible symbols on a speech output aid,
- a 6-year-old with a communication book in the cafeteria with speaking peers,
- a 7-year-old printing out homework after arriving at school, and
- a 7-year-old with an electric wheelchair and communication device taking the daily lunch count to the secretary in the school office.

Computers

In addition to being tools, computers are great activities for interaction, learning, and recreation. Drawing and writing are meaningful modes of communication that are often overlooked for children with severe disabilities. Such activities should be stressed. Following are examples of computers in use:

- The teacher and a group of children are in front of a computer playing a computer game.
- An individual child is using computer to draw.
- Two children are using switches to play a game, one child with physical disabilities, the other child without.
- A child is learning to scan so she can indicate her preferences.
- A child is writing a letter.

Step 3: Write specifications prior to selecting a communication device.

You would not buy a house or a new jacket without knowing what kind you were looking for. You have specifications in mind, even when you don't write them down (e.g., I wear a size 8, look best in blues and greens, won't spend over $150, want it to be warm, probably wool, am willing to have it dry cleaned, and so forth). Good shoppers also know the current fashion (i.e., what's on the market) and where to get the best buys.

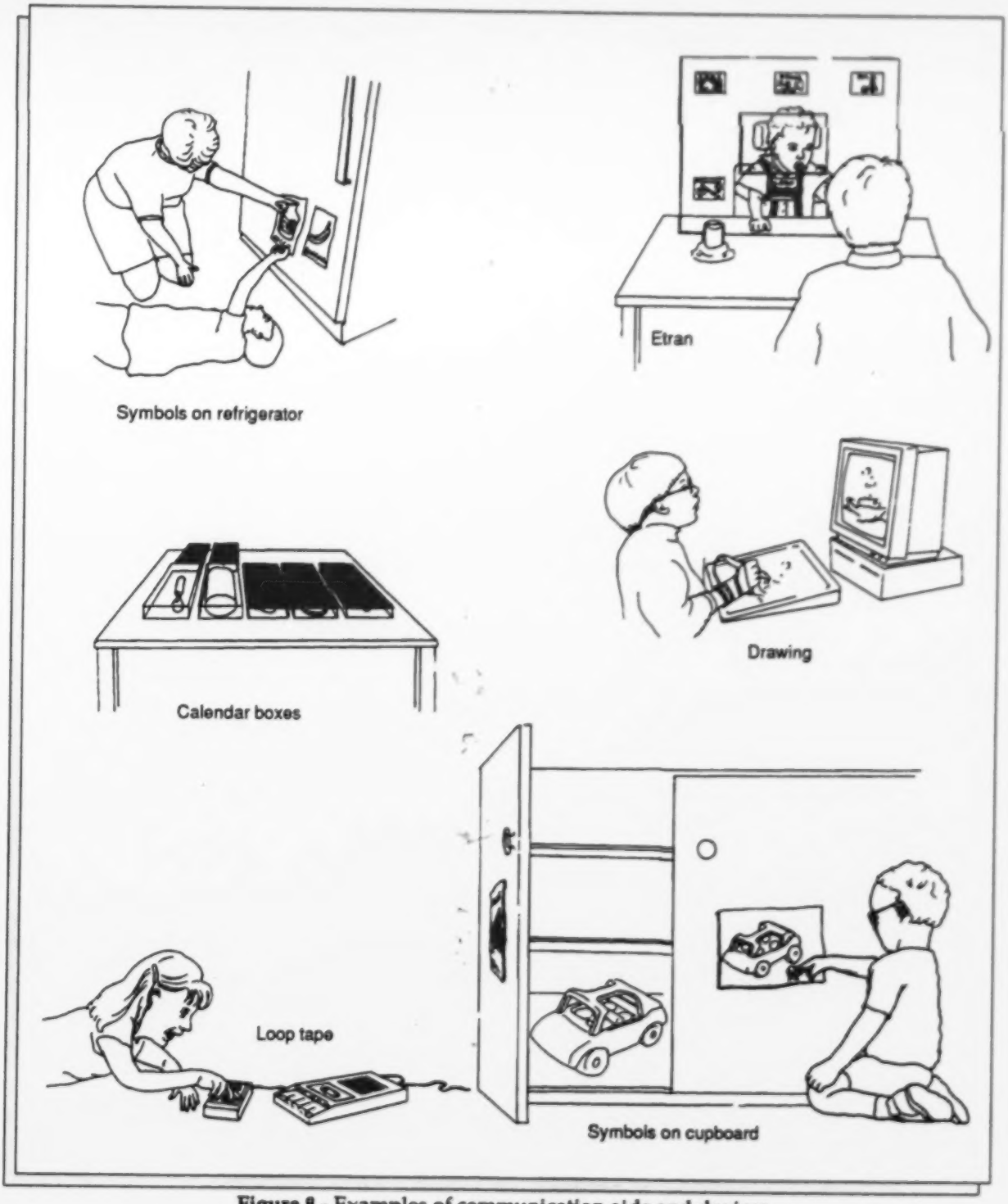


Figure 8 - Examples of communication aids and devices

Do not consider recommending a communication device for a child without first generating a list of specifications. Do it in writing! Specifications begin with the word must:

- must permit the use of graphic symbols,
- must provide intelligible speech output,
- must be able to mount on the wheelchair, and
- must be easily removed from the wheelchair.

These "must statements" are based on assessment data about the individual's needs and capabilities, the context, tasks needing to be accomplished, and partners (i.e., what we learn about the child and his or her unique set of circumstances).

Specifications are generated by the team from information collected during the assessment phase of intervention. Earlier in this module we discussed the little girl who had normal intelligence, age-appropriate comprehension of language, and severe cerebral palsy One of the many IEP goals for A. was to increase her level of independence and participation in the classroom and with her peers. An electronic communication device was needed, and the following list of specifications was generated by her team:

- must be acceptable to A. and her family;
- must allow language to be represented using both graphic and alphanumeric symbols;
- must allow communication with younger and older students;
- must facilitate the development of literacy skills;
- must allow her to be operationally competent (i.e., be able to demonstrate basic understanding of how the device operates and be able to use it to accomplish some communication tasks without assistance from others) within 3 months;
- must take advantage of her ability to use head control to point to symbols (i.e., allow her to directly select messages);
- must allow for use of a light pointer or light sensor when positioned in her wheelchair 10-12 inches from the device;
- must allow for row, column, or block scanning input (until she is more efficient with the light and then during times of fatigue);
- must have intelligible speech output, preferably a child's voice, so she can communicate with peers;
- must have printed output (printer does not have to be built in) to facilitate literacy skill development and permit written communication;
- must interface with an Apple IIGS computer so she can take advantage of hardware and software already available in the classroom;
- must provide several types of rate enhancement strategies that permit her to store and retrieve messages (e.g., abbreviation expansion—alphanumeric

codes used to retrieve messages, such as wd = I want a drink; semantic compaction—iconic codes used to retrieve messages such as picture of a *girl* and *cup* = I want a drink);

- must be available for a trial period (at least 1 week) so a field test can be conducted to determine the appropriateness of the device in meeting the specified needs as well as the acceptability of the device to A., A.'s family, and the professionals that work with her;
- must be available in school, at home, and in the community 12 months a year;
- must provide access to a vocabulary of at least 500 words with potential for over 2,000 words;
- must allow A. to demonstrate at least a 10% improvement in accuracy after 1 week of motor training using the light sensor/pointer;
- school district must agree to purchase the device as an educational tool with other agencies/family agreeing to participate in funding, if necessary;
- must not cost more than $5,000 because of limitations in district and agency funds;
- instruction must be available to teach her and her family the mechanics and functional use of the device;
- support must be provided to the teacher regarding how to implement the device in appropriate activities throughout the day (Note: Some activities will target other assistive technology techniques or simple choice-making strategies); and
- company selling device must provide warranty and must agree to provide initial support to staff for training.

Based on these specifications and what was available in 1990, three devices were selected for a field test. These were compared to determine which met the required specifications (and to what extent).

The speech-language pathologist, A., her mother, and the occupational therapist were identified on the action plan as the individuals responsible for the field tests. Arrangements were made to try each device for approximately 3 weeks. (*Note*: If devices are not accessible for a field test, performance trials can be conducted by simulating a variety of device features on a computer or a device. For example, different types of encoding techniques [e.g., abbreviation expansion, iconic coding] can be simulated on most devices. However, evaluating a child's use of a device under real conditions provides important information. If the child shows no interest in using a device or if partners are not interested in providing support, purchase of the device is not indicated.

Other aspects of A.'s multimodality system were being implemented concurrently during this process. For example, her teacher learned how to give A. opportunities to respond beyond *yes/no* in the classroom and how to repair communication breakdowns. The occupational therapist developed a protocol to begin

motor training activities using a light pointer and made sure that A.'s positioning was optimized for communication and for control of the light sensor/pointer she needed to use to activate the device. The speech-language pathologist designed and made two initial overlays to be used during the device trials. One overlay had vocabulary related to a recess activity; the other was designed for use in her reading group. Her instructional assistant taught two of her friends to interpret her eye pointing to an Etran during structured recess activities and story time. A special educator identified and began evaluating reading, writing, math, and art software.

As it turned out, no device met all specifications. However, A. preferred using a device that allowed her to sequence phonemes (creating gibberish) and did not require someone to change her overlays. She demonstrated great skill in recalling semantic and alphanumeric codes. The staff had limited time for programming and was interested in having the vocabulary oriented to her academic program. The team felt strongly that A. should *spend her time in first grade doing what other students were required to do, not learning how to use a communication device.* The final decision was to recommend purchase of one of the devices. The first grade teacher, speech-language pathologist, and her parents agreed to attend a training session and to teach her to use the device over the summer. Administrators in the school district supported the plan. The manufacturer's consultant agreed to support them during the summer and fall.

Step 4: Develop a participation plan for system implementation and a training plan for staff.

In our previous discussion of E., the young girl with severe cognitive impairment associated with a rare, genetic disease, the team concluded that her current level of cognitive and linguistic function was well below 9 months. No symbolic behaviors were demonstrated or reported. A list of communication needs was generated and prioritized at a group meeting with her father, teacher, aide, occupational therapist, and speech-language pathologist. Her assessment data are summarized below:

- vision and hearing within normal limits;
- ataxic motor pattern, ambulatory (although very unsteady);
- play behaviors limited to visual exploration, shaking, dropping, and mouthing;
- cognition probably in the severe range of mental retardation;
- very limited sound repertoire, both qualitatively and quantitatively;
- limited understanding of single words, although has inconsistent response to *Daddy* and *hot* in a familiar context;
- limited awareness of communication partners; does not use people as agents;
- expressive repertoire is limited; does not make requests; reaches directly toward the food; goes to the sink for a drink; and

- preschool staff is currently introducing pictures as symbols during a snack activity as part of her current communication program (e.g., when she wants a drink, she is prompted to point to a picture of a cup. She does not appear to understand the connection).

Unfortunately, the emphasis of her program had been on use of symbols rather than on developing some basic communication skills. E. does not yet see adults as the tools or the fun interactants they are! Her repertoire of communication behaviors is very limited. The staff's focus on developing picture symbols was seen as premature.

Team members agreed that her program should emphasize the development of communication signals (natural gestures, vocalizations, eye gaze, pointing) and that classroom staff needed training so their expectations would be more realistic. Goals were to

- facilitate the use of signaling behaviors because they are accessible to her at all times in all positions;
- increase her ability to understand that she can interact with people (i.e., social communication) and use them as agents (i.e., means to an end);
- increase her expressive repertoire and use of natural gestures, eye gaze, facial expressions; and
- encourage expansion of play behaviors (i.e., ways of relating to objects).

An example of her participation plan is found in Figure 9. This plan defines who is doing what. For example, multiple opportunities are being provided for her to perceive adults as individuals with whom she can interact. When she reaches for a desired item, it is brought close to the face of the adult to encourage the likelihood of her looking at the adult while reaching for this item. Gradually, the distance between the object and adult is increased.

Another component of her plan is to encourage and reinforce meaningful use of vocal behaviors. She engages in them during motor activities (e.g., when being rolled over a ball by the occupational therapist). A final focus of intervention is to teach her the functional use of objects and encourage her to use a variety of exploratory behaviors by providing toys with multiple features.

You have now completed the Program Development and Implementation Phase and are ready to move to a discussion of Expansion.

Communication System Components Used	Symbols Needed	Technology Used	Mobility, Seating & Positioning Needs	Strategies/ Modifications to Activity to Ensure Participation	Peer Roles	STAFF/ADULTS		
						Setup Who/What	Implementation Who/What	Training Who/What
Loop tape Choices with eye gaze to objects Eye gaze to locations Vocalizations Functional use of objects	Objects depicting daily activities	High: Loop tapes (for predictable speech output and refrains in songs) which can be activated by AbleNet "Big Red" switch Low: Calendar boxes	Needs to be at eye level with kids Needs to see teacher Needs to be close enough to teacher to receive clear auditory signal	Time delay Set up AbleNet control unit Have symbol and loop tape available	Recognize her gestures Hold choices 2' apart Wait for her to respond	Loop tape and switch: Instructional aides Positioning: Instructional assistants Symbols: SLP and teacher	All All Use of all communication system components: teacher, SLP	OT: Seating and positioning SLP: Signals Peers SLP: Loop tape Use of symbols Teacher: Peers Instructional assistants

Figure 9 – Example of E's participation plan (Circle Time)

Phase 3 Expansion

Overview

The goal of expansion and independence is to gradually shift responsibility to the child and the child's primary partners. After determining which augmentative communication components best meet the specifications and ascertaining whether the intervention strategies address specified communication goals and objectives, the intervention focus shifts to the actual application of communication aids, techniques, strategies and symbols to help the child participate in daily activities. The intensity of direct services to the child decreases, while support to teachers, instructional assistants, family members and other care providers, and peers remains constant.

Teaching Functional Communication Skills

Major areas of focus in teaching functional communication skills are communication intent, discourse skills, facilitating comprehension, and facilitating expression. It is often worthwhile to look at the expectations of all individuals involved with the child, including care providers and professionals. When the prevailing attitude is for children to "be still, be quiet, and be good" (the three "be's"), providing opportunities for children to develop a range of functional communication skills can fail miserably. Be sure communication really is an adaptive behavior in each context. If it is not, you need to change the attitudes of others.

Communicative Intent

Young children communicate for different purposes. The communicative intents expressed fall into categories that are fairly consistent across languages. These intents are discussed as "speech acts," we think of them as "communication acts" because they also may be accomplished without speech.

Listed below are a variety of communication intents and examples of how each intent can be taught to children who require the use of multimodal approaches. During such activities, it is important to remember the child's need for adequate sound amplification (see the *Listening and Hearing Supplement* for more specifics).

Greetings/Partings

Without technology

Greetings and partings can best be accomplished using standard augmentative techniques (e.g., vocalizations, gestures).

- **Use time delay** (i.e., pause) when the child arrives at school or at home. Direct your attention away from the child. When he or she exhibits a target behavior (wave, vocalization, says "Hi"), respond immediately. Interpret the child's behaviors as greetings or partings.

- **Use modeling.** Whenever possible provide an opportunity for the child to observe others saying "Hi" and "Bye" using approaches that are within the child's repertoire.

With technology

- Select textured symbols or pictures that the child can learn to associate with greeting or parting (e.g., a picture of someone waving). Place the child near the door. Instruct the child to remove the symbol and hand it to someone who is coming and going; if he or she is physically unable to do this, teach the child to look at the symbol until someone responds (e.g., "Look, David says hi to everyone!").
- Use a loop tape with a switch that says "Hi, I'm here!" or "Bye, bye. It's time to go!" Practice using the loop tape by pretending to arrive or leave. Provide as many opportunities throughout the day as possible. Make sure others respond appropriately. The loop tape may be used by all children so that peers can be models as well.
- Any device with speech output can be programmed to say "Hi," "Here I am," "See you later, alligator," or "Good morning everyone." Provide lots of opportunities to practice.
- Strategies described in the "without technology" section—time delay and modeling—are also important to use "with technology."

Gaining Attention

Without technology

Vocalizations and gestures are the most efficient way for children to get attention. Another way (which they learn quickly) is to "act out." Early intervention can teach children ways to call attention to themselves that are effective and socially acceptable and can help them to avoid maladaptive behaviors that can seriously affect the child's opportunities in life. Strategies to encourage adaptive attention-getting behaviors are similar to those described in the greetings/partings section.

With technology

Buzzers, bells, and speech output aids that say "come here, please," "teacher," "mom!" may be used when children are unable to vocalize or move. Also, for children who do not appear to want to interact, call signals that they can touch may be used to help them learn that their behavior can have positive effects.

Requesting

Remember that children (some as young as 12 months) ask "Wha'dat?" When designing communication displays, be sure to include symbols that allow children to ask "What'dat?" "Where going?" "Wha'doing?" On low- and high-tech devices you also may wish to use a full phrase approach for some children (e.g., "Gimme some, please") and expect others to sequence several words (e.g., "I want that").

Requesting actions/objects

Without technology

Create situations where the child needs assistance by not anticipating their every need. Good strategies to consider are the use of time-delay and sabotage (e.g., set up situations where something the child needs is not available).

- **Requests for an object** – Pass out pudding and forget to give the child a spoon (sabotage); pass out paints to all but one child and wait until he or she gestures or signals (sabotage and time delay).
- **Requests for action** – When going out to recess, stand behind the child's wheelchair and wait until he or she asks to go (time delay).

With technology

Picture Exchange Communication: The Delaware Autistic Program (Bondi, 1990) exemplifies the use of technology for requesting. It introduces symbols in a communication exchange (i.e., you give something to get something). The focus of the picture exchange strategy is to promote successful interaction, which is a particularly difficult problem for children with autism. Begin by using the following steps:

- Identify desired objects (i.e., things the child reaches for) and take pictures of them. (Children are not expected to know that the picture represents the concept/object).
- Put the picture in the child's hand as he or she reaches for the object.
- Assist the child in giving the picture to an adult. The adult responds as if the child were talking (i.e., making a request). Then, the child gets the object.

The goals are for the child to pick up the picture and put it in the adult's open hand (i.e., to communicate his or her desire for the pictured object). The adult gradually moves farther away from the child. Children eventually learn to pick up a picture, look for an adult, and then give it to the adult. Adults treat each exchange as linguistic communication, but the emphasis remains on interaction. Data on 24 children under the age of 5 revealed that in less than 1 month, all of the children were using a picture to make a request. The child is not taught to point to pictures because that does not demand a focus on the interactive exchange.

Requesting information

Without technology

Set up situations that encourage the child to wonder.

- Put something in a box and shake it, then look at the child and ask "What's that?"
- Pretend to lose something obvious (e.g., the Christmas tree) or somebody who is present. Walk around the classroom asking/signing "Where's the Christmas tree?" or "Where's Bobby?"

Throughout such activities, take turns, allowing the child an opportunity to use "wh" questions by signing, vocalizing, or verbalizing.

With technology

Again, set up situations that encourage the child to wonder. The key with technology is to ensure that appropriate vocabulary is available to the child. For example, symbols for "wh" questions need to be on communication devices. Begin with "What's that?" and "Where" questions. Strategies described for children not using technology are equally appropriate.

Responding

Responses are speech acts that occur directly after an utterance by a partner. A "yes" or "no" response is often the most partners expect of children with a severe communication disorder. To expand the communication skills of these children, a major focus of communication intervention is to teach partners how to provide choices and ask "wh" questions. Most likely, this behavior change will not be easy; guided practice may be helpful to *partners*. Children need to learn to answer a range of questions, agree or disagree, comply or refuse, qualify or clarify.

Without technology

Ideally, a range of responses should be developed that include "yes/no." Be aware that "yes" and "no" are forms that can serve many functions and that some of these functions emerge earlier (e.g., protest) than others (e.g., "Is it a dog?"). If at all possible, children should be encouraged to express "yes" and "no" with intelligible vocalizations or head shakes/nods. Signs or symbols may be used; however, most people do not know the sign for "yes" and "no." Avoid using a happy face for a "yes" and a sad face for "no" because the child should not confuse negation with sadness or poor behavior.

Finally, do not make the mistake of teaching "yes" and "no" at the same time! Developmentally, most children use a gestural (head shake) and a verbal rejection (i.e., "No") several months before they use a gestural and a verbal expression of affirmation (i.e., "Yes").

At every opportunity, children should be provided with choices. A simple way of getting a response to a "wh" question, finding out if the child agrees/disagrees, or if the child will or will not do something is to offer the child a clear choice.

- Hold up two toys and ask the child to look at/select the one he or she wants.
- Ask the child a question, such as "What do you want to do next?" Hold up your left fist while saying, "Have some juice?" Then hold up your right fist and say, "Go for a ride?" Tell the child to point to/look at the correct choice.

With technology

Any kind of communication display or symbol can be used to offer choices. For example, choice boards can offer a limited number of symbols and give children the opportunity to select activities or objects from a display (see Figure 10). Speech

output devices are very useful in helping children express their opinions to a group and to individuals who may not understand the symbols or special techniques being used.

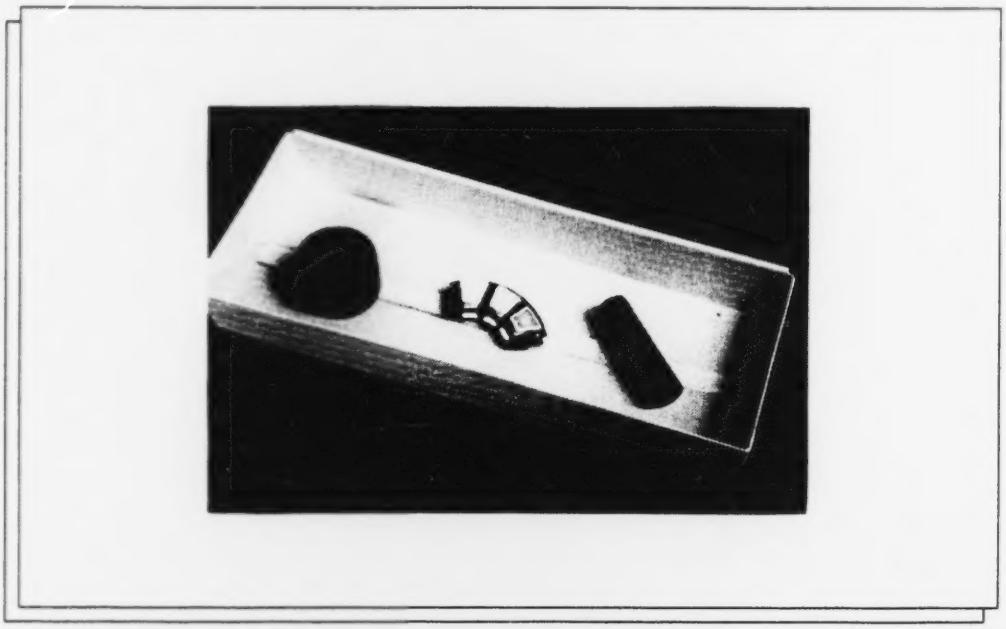


Figure 10 – Object display for making choices

Describing

Without technology

Learning to express emotions is important for all children.

- Use manual signs to label the emotions the children are feeling (e.g., anger, happiness, silliness, fear).
- Engage in an activity during which you can ask the child to act out different emotions.

With technology

- Children can select messages to articulate their feelings using graphic symbols, speech output devices, a language master, or a loop tape.
- Preschools provide numerous sensory experiences that a child can describe (e.g., petting a hamster feels soft; playing in the snow feels cold and wet; fingerpainting feels oozy). Such symbols can be used with all children in a class, whether or not they have communication problems.
- Feely boxes provide another opportunity for using descriptive words (e.g., hard, squishy, sharp, sticky).

Again, it is important to have appropriate vocabulary available to the child using an augmentative device.

Commenting

Without technology

Children comment about everything (e.g., "See," "Look, airplane, Mommy").

- Initially encourage a child by holding up an object or doing something silly; wait for the child to do something. Interpret the child's behavior as a comment.
- Encourage the child to comment by pointing with his or her arms, eyes, or even feet by asking, "Is there something you'd like to say about that?" Give the child opportunities to comment.

With technology

Set up situations and provide the necessary vocabulary (via objects, symbols, synthesized speech) to facilitate commenting. It is likely that all necessary symbols will not be available because it is very difficult to provide a complete vocabulary. Children are most likely to comment about that which is unusual, novel, not present, and so on. Providing generic vocabulary, such as "Look at that," "Wow!" can help.

Discourse Skills and Repair Strategies

Young children need to learn how to initiate interaction, introduce and maintain a topic over several conversational turns, discontinue an interaction, repair conversational breakdowns, and so on. This process is referred to as discourse. For children using technology, intervention strategies to facilitate discourse skill development are always necessary. It is of paramount importance, of course, to provide the child with the necessary vocabulary. Conversation and interaction is a shared responsibility. Both partners play a role, and the behaviors of one affect the other. The goal is for the child to be an active participant in an interaction.

Turn-taking skills

Learning that "you talk, I listen, and then I talk, you listen" is a skill that begins to develop in infancy. Children who have difficulty speaking (particularly those with physical disabilities) are often denied their conversational turn. The rhythm of an interaction is important for the comfort of both partners. It is often necessary to reduce the rate of conversational exchanges when interacting with a child (or adult) who uses sign language. It is always necessary to do so when the child is using a communication board or a device. This requires modification of the partner's behavior (i.e., he or she must tolerate longer periods of time between responses, be careful not to interrupt, ask permission to predict what the child means, check to see if their interpretation of the message represents the child's intent, and so forth).

Initiation

- **Getting attention** – See "Gaining Attention" in the Communicative Intent section above.
- **Establishing topic** – Young children communicate about a variety of things. For example, when a child points to an object, he or she has established a topic. We know the child wants to "say" something about the object (e.g., he may want someone to get it, take it away, or give it to someone else). Children with severe expressive communication impairments often have trouble establishing topics, particularly if what they want to talk about is not present. Strategies to assist children in establishing topics might include a remnant book. A remnant from an activity is placed in a pouch or book that accompanies the child to and from home and school (see Figure 11).
  - After a trip to the park, several blades of grass might be taped to a 3" x 5" card and put in the remnant book. The child might show the card to his or her mother to begin a conversation. On the card the teacher might write "Ask me what this means."
  - Special topic boards/communication displays, as well as vocabulary programmed into devices (such as "I want to talk about ..."), can be used to establish topics.

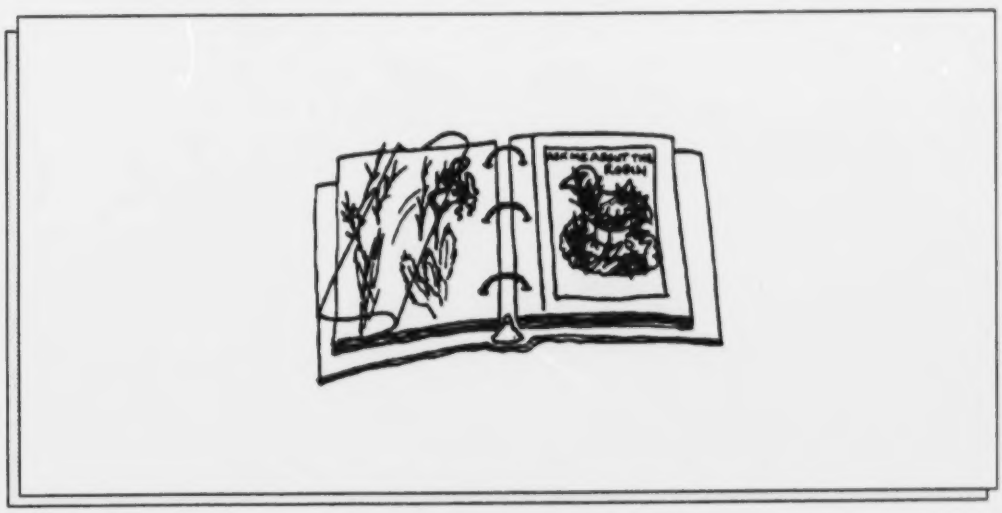


Figure 11 - Remnant book

Develop contextual sensitivity/repair conversational breakdowns.

It is very important for children to be able to solve the communication problems they encounter. We learn from our mistakes only when we are aware of them. Thus, it is important for us to give children honest feedback. If you don't understand a child, don't pretend you do. Tell them and then help them figure out how to make their message understood. Support them in discovering a variety of ways

to communicate with people. Gradually build their self-awareness of what modes to use, when, and with whom. Encourage them to be aware of how people react to them so that ultimately they can assume responsibility for their own communication by having a sense of what they do and what works and what does not.

Comprehension

There is a tendency to underestimate or overestimate how much children who are unable to speak can understand. When we do either, we put these children at a disadvantage because we are not likely to provide them with what they need when they need it. To facilitate each child's development and allow learning to occur, there is a critical need for language input at appropriate developmental levels. In addition, the following strategies should be used to optimize language comprehension.

Observe acoustic environment and maximize peripheral hearing.

Consider all degrees of hearing loss and the impact of the hearing loss on language acquisition. Develop each child's listening skills using assistive technologies recommended by your audiologist. (For a more detailed discussion of technologies to assist with listening, refer to the *Listening and Hearing Supplement*.)

Develop contingency awareness and causality.

Treat everything the child does as meaningful language and respond accordingly. For example, "Look what he says with his eyes." "He's talking with his feet." "He's telling me to pick him up."

Facilitate communication opportunities.

Set up situations that increase the likelihood that the child will attempt to communicate. For example, position the child so he or she is aware of your presence during a shared activity. Don't anticipate every need; expect the child to communicate.

Establish an exchange by stopping and waiting for the child to take a turn.

Dunst (personal communication, January 1990) suggests waiting 3 seconds for children functioning in the 2- to 3-month range; 15 seconds for children functioning at 12 months; and 30-40 seconds for older children. Waiting for a child to communicate implies he or she can understand and has something to say. Expectation of a response facilitates growth in language comprehension.

Set up the environment so the child is stimulated with symbols as well as verbal language.

Secure indoor-outdoor carpet to the back of cabinets, on bulletin boards, and in hallways. Attach communication symbols (i.e., real or miniature objects, photographs, graphic symbols, textured symbols) with Velcro.

- Set up the classroom so that toys that imitate life and their corresponding symbols are in play areas (see Figure 12). For example, Fisher Price toys can serve as catalysts for communicating (e.g., Fun with Food, McDonald's).

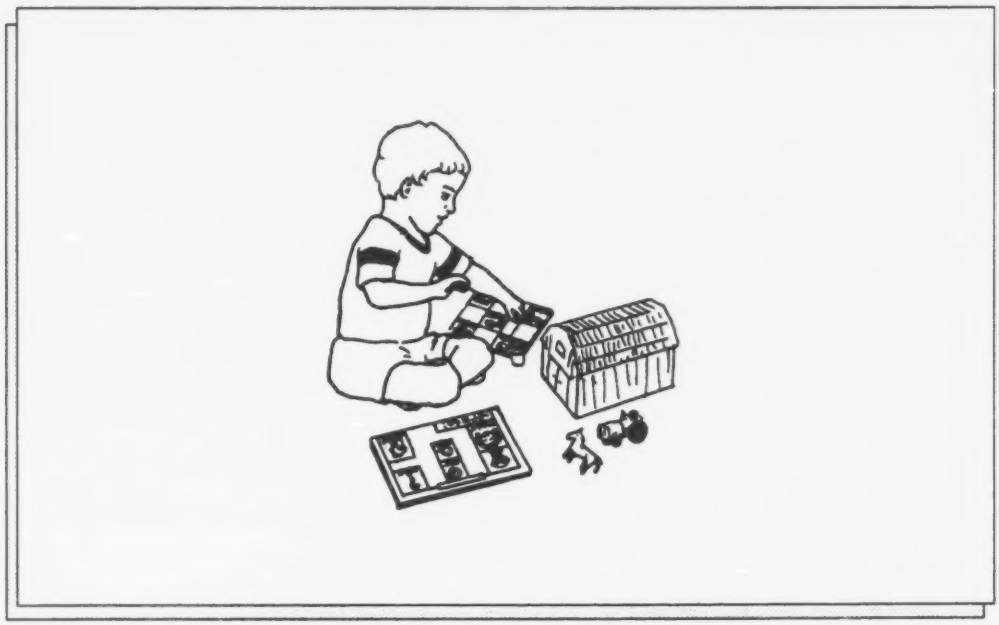


Figure 12 - Toys and corresponding symbol displays

- Place communication symbols throughout the school building. For example, each classroom, bathroom, and entrance, as well as the cafeteria, office, or art room, could be represented by a symbol (see Figure 13).

Make and use communication boards for aided language stimulation.

To provide aided language stimulation, the use of symbols on communication displays is modeled by pointing to them as you talk or employing some other method to highlight their use during each interaction with the child (see Figure 14).

Teach symbol/meaning relationships.

A symbol stands for something else. Graphic symbols and signs stand for words (or sometimes phrases); and words represent objects, events, actions, ideas and concepts. Even for adults, it is not always easy to learn a new symbol, especially if you have to learn more than one at a time. Being in a foreign country and not knowing the language quickly teaches us that!

While learning to associate augmentative symbols to their referents may occur rapidly when children have a well–developed language base, it can be a very slow process for children who have minimal language comprehension or severe learning difficulties. Recent research suggests children who use augmentative communication may have different symbol learning patterns (Romski & Sedlik, 1991; Iacono,

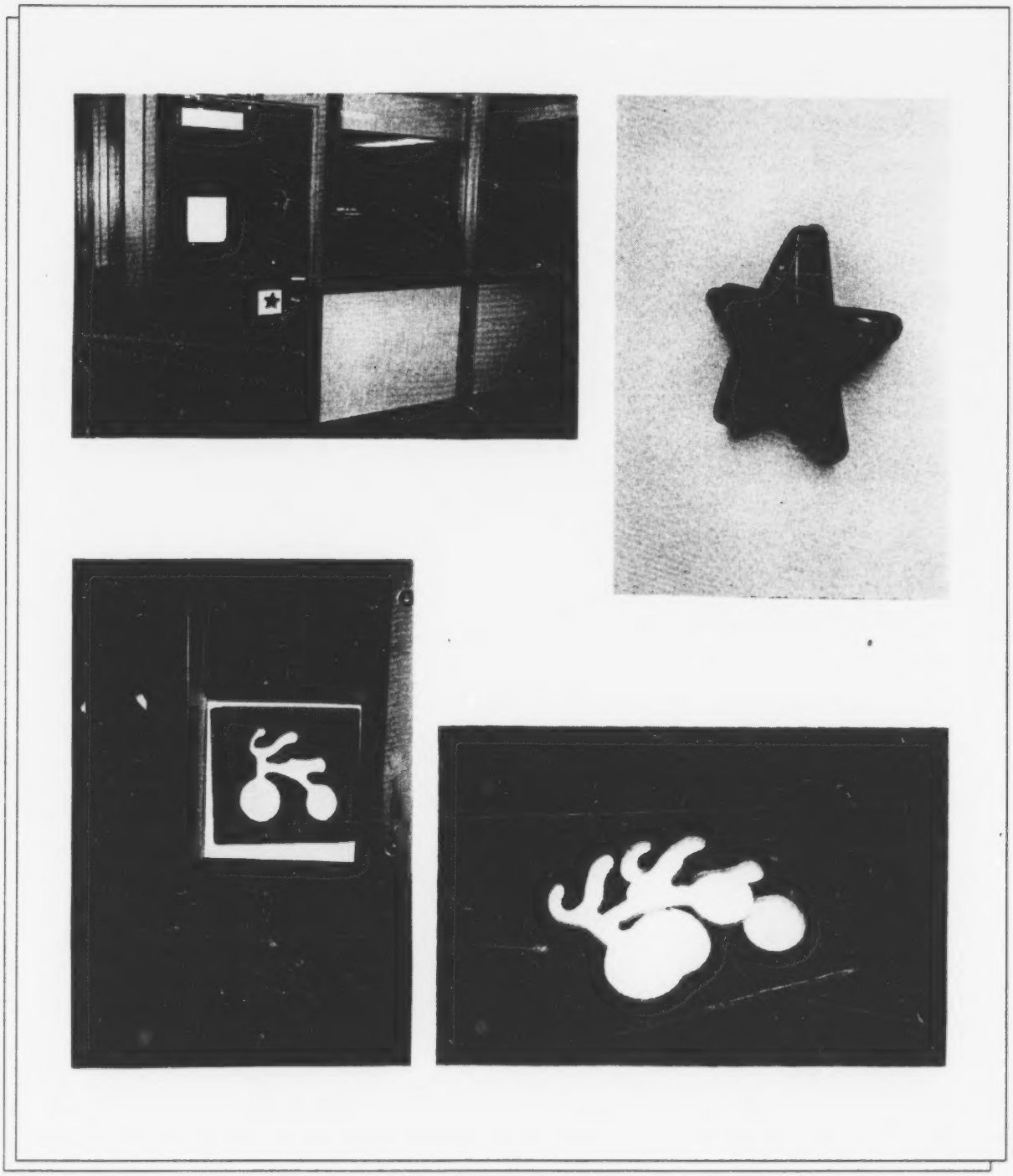


Figure 13 - Tangible symbols to identify school rooms

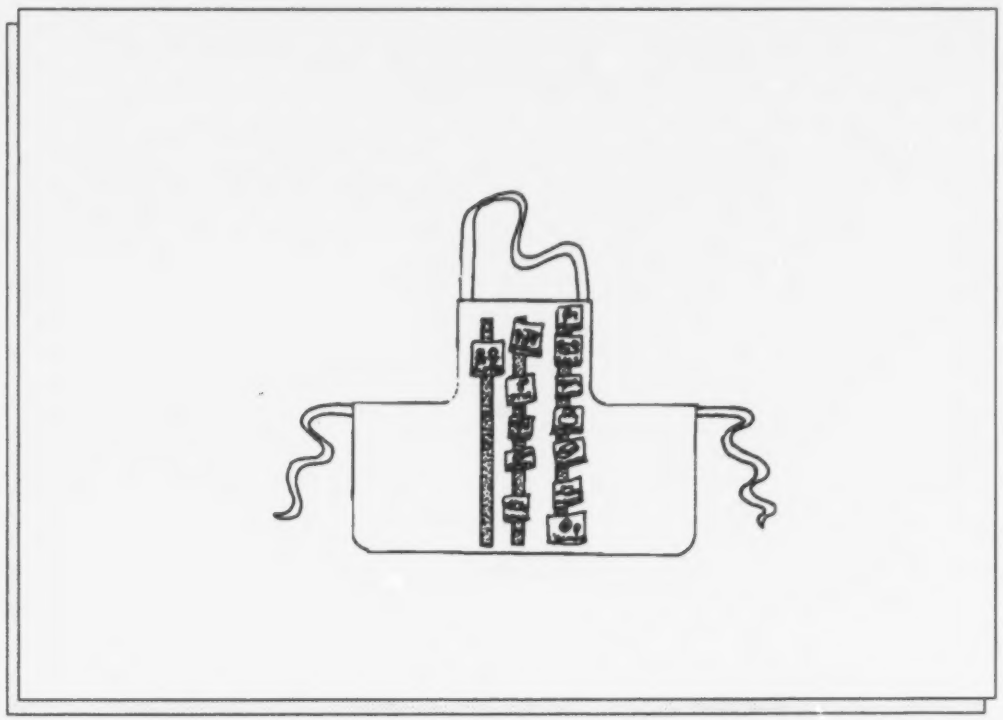


Figure 14 - Apron with symbols to use during baking activity

1992). We have begun to ask more questions about how children learn to understand and use graphic symbols, but much work still remains to be done (Blackstone, 1992; McNaughton, 1992). In the interim, we recommend you rely on established language learning strategies when teaching children graphic symbols and manual signs, and that you remain aware that you are, to some extent, teaching a "second language." Principles from both areas of practice apply.

Use voice output communication aids to enhance comprehension.

Voice output communication aids provide consistent output and may make it easier for some children to attach meaning.

Two activities that can be used to facilitate comprehension at home and in the classroom follow.

Activity #1 – *Setting: Home, bathing activity.* An occupational therapist begins by helping the mother position her child in a bathing chair. With hands now free, mom feels more secure knowing the child is safe. Toys can be introduced to make bathing fun and to prompt movement, reaching, and grasping. A few weeks later, communicating goals can be overlaid. The emphasis is on engineering the environment for aided language stimulation and choice making. The mother and augmentative communication consultant make pertinent decisions about symbols and attach them to the wall around the bathtub. The consultant shows mom how to

point to symbols as she talks and demonstrates how her child can look at a symbol to choose a toy or tell her what to do (Goossens', 1990).

Activity #2 – *Setting: Day care, arrival time.* The augmentative communication consultant comes once a week for a 3-hour block of time. During the first and second week, the consultant may develop materials (symbols for aided language stimulation), place indoor/outdoor carpet in the doorway and cloak room, attach Velcro to symbols and symbols to the wall, take photographs of each child, and prepare loop tapes for all children to use to greet each other. In weeks three and four, the consultant models strategies and techniques with children as they arrive (Goossens', 1990).

Expression

Most children eventually develop some speech. However, unless partners systematically respond to vocalizations as though they convey meaning, infants and children will not learn to use their voices in meaningful ways. Much is known about how to facilitate the development of speech. Oral and speech motor programs are important components of early augmentative communication intervention.

It is important that you help identify ways in which a child can indicate messages. Don't pick reflexive movements or movements that a child finds difficult to accomplish. Effort increases tone. Following are suggestions for enhancing expressive skills:

- Respond to target vocalizations that approximate words (e.g., "at" to mean *hat*, *cat*, or *fat*). Instead of correcting children on their attempts, compliment them on their production.
- Provide many ways for the child to make choices between real foods or objects that represent foods.
- Use music, imagination, fantasy, or imagery to introduce an activity, thereby enhancing the sensory associations with that activity.
- Work technology into routines (e.g., use a battery-operated car to deliver a cracker; use loop tape to say "Good morning," "Go" or to sing a song; use a communication device to deliver messages).
- Teach discrimination and expand symbol use. Introduce an easy two-way discrimination. After approximately 10 photos/symbols are used, place them (using Velcro) on a miniboard. Children can have a personal board as well as access to activity-based classroom boards.
- Develop story-telling skills. Use a "remnant book." Using a notebook or a photograph album with peel back plastic pages, compile leftover materials from school/home activities. These remnants can be used to establish topics and encourage information exchange between home and school.
- Build in beginning use of symbol sequencing. For example, attach Velcro to the front and back of a brightly colored card and place this card on a personal/

activity board. The child can put selected pictures (want + cookie) on this board, thus constructing a message. Then, the child pulls the brightly colored card off (containing selected symbol sequences) and gives it to an adult.

Group Communication Skills

Plan activities (e.g., a new surprise every day) so there is something to talk about. Use routinized choral speaking and songs as part of activities (e.g., I want more, more, I want more of *that*!). (Additional ideas regarding group communication displays can be found in the *Education Module*).

Teaching Communication Partners to Be Facilitators

(For additional information about peer-buddy programs, see the *Education Module.*)

Communication partners can do many things to facilitate a child's communication skills. However, three strategies are critical.

- Partners must learn to give children opportunities to communicate. They must not talk for the children. They need to introduce children to other people and provide the children with tools (the assistive technology) that they need.
- Partners must be prepared to alter their own rate of interaction and interaction style. They must learn to pause and wait. They must force themselves not to repeat things over and over again or barrage the child with a stream of questions without giving the child an opportunity to answer.
- Partners must recognize that communication breakdowns/failures are inevitable. They must help a child learn to solve them. Like everyone else, children with severe communication impairments can and do learn from their mistakes. Our job is to provide the support (both technical and emotional) that allows them to solve their own problems.

Additional considerations include:

Teach partners about proper positioning.

Position the student relative to his or her communication partner, and use positioning, movement, and mobility to support interaction. Give partners tasks, such as:

- See if you can find three ways to hold him or her so you can see each other's face.
- See if he or she smiles more when you are animated or when you are talking quietly in a room.
- Think through what the child does when you momentarily stop feeding or rocking him or her.
- Does the child do something to get a cookie? What is it?

- Can you get him or her to do it again?

Teach partners about the mechanics of any and all technologies.

Systematically and slowly familiarize partners with recommended and prescribed augmentative techniques (e.g., manual signs, mechanics of aids, switch activation, maintenance). Encourage hands-on experiences and provide opportunities for guided practice.

Teach partners about how to facilitate the use of all technologies.

Strategies to keep in mind when teaching partners how to facilitate the use of all technologies:

- Consider partner's ease/comfort.
- Provide general information about difficulties encountered by users of augmentative techniques and their partners using case examples, testimony from family members or teachers, videotapes, printed materials, and the literature.
- Discuss expectations and myths regarding the use of augmentative techniques.
- Describe and discuss the child's problems and current goals.
- Train the partner to recognize multiple avenues of communication.
- Emphasize the necessity of using vocalizations, speech, and natural gestures, when possible, to express messages.
- Select a limited number of objectives based on team recommendations as delineated on the action plan.
- Begin with easily attainable objectives that make a real difference.
- Discuss specific training strategies. Demonstrate procedures, practice use of strategies, provide constructive feedback.
- Elicit feedback from partners regarding training strategies and the intervention program. Make necessary accommodations and adjustments.
- Evaluate results of the program. Reassess the competence of the communication partners.

Involve family members.

- Introduce families to a proactive approach to communication intervention (i.e., developing multiple ways to communicate effectively). The terms "total communication" and "augmentative communication" may hold negative connotations for family members (i.e., "professionals are betting against speech").
- Use guided observations and video training packets. Many families have VCRs.

- Encourage families of children who use augmentative techniques to share their experiences with family members who have concerns.

Involve and train staff.

The following activities are designed to raise staff awareness of how their behaviors affect the communication process (Bledsoe, 1991).

Activity #1 – *approximately a 45-minute session.* Staff members interact with the children as usual, but they are not allowed to speak. They are encouraged to tune in to natural gestures and cues and to become aware of how they use other modalities to communicate (access real objects to symbolize something, point to pictures, use facial gestures, gestures, and so forth).

Activity #2 – *45 minute session.* The staff is not allowed to initiate anything. If children interact with staff, they may get involved using whatever modes are available, including speech. The room is set up so that toys and activities are accessible.

Since you now have an idea of what is involved in expanding the use of assistive technology by the child and his or her communication partners, you are ready to explore Independence and Growth.

Phase 4 Independence and Growth

This phase is the most important of all. Yet, it is difficult to write about because strategies for this phase are very individualized. By definition, the involvement of professionals is minimal. Families often fear this phase because of their concern that professionals will not be available if and when they are needed and because they worry about future transitions and problems children may face.

This phase recognizes several realities:

- Ultimately, children and families are the ones who need to know about how communication can occur effectively and efficiently.
- Competencies must be developed and achievements must be attained by children and their families and friends, not professionals.
- Support must exist in the child's home, school, and community, and it must come from people who live and play with the child every day.

Adolescents and adults who are unable to speak and use assistive technology can be effective communicators, and many already are. It is their achievement, their visions, and their advocacy that is teaching parents and professionals alike to provide the tools and encouragement needed and to let each child achieve and grow.

Let us go back to A. and E., whom we first met at the beginning of this module. A. is now in a regular third grade class. After spending the summer learning to use a new communication device, she achieved many goals, such as techniques for storage and retrieval and age-appropriate writing skills. Her parents and teacher are comfortable with her technology, having completed special training sessions. They feel that they have successfully met the challenges of more than a few implementation problems over the summer. The manufacturer's representative for her communication device was a source of support, but now is rarely called. Any troubleshooting regarding A.'s device is being handled by the teacher in charge of students with orthopedic disabilities. The community's technology group also serves as a backup for questions the team cannot answer. A.'s teacher and her speech-language pathologist have collaborated to plan classroom activities that integrate her device and her low-tech techniques so that communication, speech, and language and literacy skills can continue to develop. Independent mobility training is the only "therapy" that occurs outside her classroom. All agree she needs to be in the classroom all day long to maximize her learning of academics.

Her program has always been "dynamic." For example, during one period she was in the assessment phase for an electronic wheelchair, the system implementation phase for an electronic communication device, the expansion phase for a computer with a new word processor in the classroom and at home, and the independence and growth phase for use of low-tech techniques with her classmates.

A. was the first speaker at a recent schoolwide assembly. She accomplished this task without adult support and began her speech by asking the audience (using a

speech synthesizer), "Can you hear and understand me?" Academically, she has achieved grade-level scores on standardized tests. She attends school with her classmates and hangs out with them after school. Her future educational goals include graduate school.

E. spends part of every school day in a regular education classroom. This has not been an easy task to accomplish, as her teachers originally were not sure how to include her in activities. However, she now participates in portions of group projects and contributes to them with support from an instructional assistant and some of her peers in the first grade. E. attaches meaning to many symbols and is using some to request events and objects she wants. She is also interested in pictures. Her teacher and therapists are beginning to use a few pictographic symbols when they communicate with her. Other communication tools she uses include a computer to participate in group activities and a speech output device (looptape) to greet classmates and ask for water. E. has friends in her regular and special classes. She uses a walker independently to go with her classmates to recess and the cafeteria. Although she still does not use vocalizations communicatively, her gestures, facial expression, and assistive technologies allow her to interact more effectively with people at school, at home, and in the community.

Chapter IV Summary

As you approach the end of the *Communication Module*, there are certain salient points that bear repetition:

- Every interaction is an opportunity to help young children develop language and communication skills and learn about interaction.
- Intervention goals are for families, clinicians, and teachers, as well as for children.
- While there are no prerequisites for communication intervention, specific skills and abilities are required to learn and use certain symbol sets and graphic or manual language systems, as well as special augmentative communication techniques and devices and other assistive technologies.
- Assistive technology is a means to an end, not an end in itself. Augmentative communication devices, techniques, strategies, and symbol sets are *tools that* provide opportunities for communication, language growth, exploration, participation, control, self realization, and achievement.
- A child's speech is a major concern of most families; therefore, opportunities to develop speech should never be missed, particularly during early childhood.
- Mobility devices that assist children in controlling and manipulating their environments also facilitate communication. Independent mobility may be one of our most effective intervention strategies.
- Careful attention must be paid to the acoustic environments within which children are expected to learn and communicate.
- Enjoy! Have fun!

We wish you success as you work with young children who need assistive technologies to enhance their communication. We trust this self-learning package will serve as a reference for you to return to as needed.

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Appendix A Assistive Technology Resource List

State Resources

Pursuant to federal legislation, the following states have been funded to develop consumer responsive, statewide, technology-related service delivery. For information about this project, contact

Carol G. Cohen
Rehabilitation Program Analyst
National Institute on Disability and Rehabilitation Research (NIDRR)
U.S. Department of Education
400 Maryland Avenue, SW
Washington, DC 20202-2645
(202) 732-5066

Alaska
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Program Coordinator
Alaska Assistive Technology Services
Division of Vocational Rehabilitation
400 D Street, Suite 230
Anchorage, AK 99501
(907) 274-0138
FAX (907) 274-0516

Arkansas
Sue Gaskin
Project Director
Department of Human Services
Division of Rehabilitation Services
Increasing Capabilities Access Network
2201 Brookwood Drive, Suite 117
Little Rock, AR 72202
(501) 666-8868
(800) 828-2799 (in state)
FAX (501) 666-5319

Colorado
Bill West
State Coordinator for Assistive Technology
Rocky Mountain Resource and Training Institute (RMRTI)
6355 Ward Road, Suite 310
Arvada, CO 80004
(303) 420-2942
FAX (303) 420-8675

Connecticut
Jon A. Alander
Commissioner
Connecticut State Department of Human Resources
Bureau of Rehabilitation Services
1049 Asylum Avenue
Hartford, CT 06105
(203) 566-3318

Delaware
Beth A. Mineo
University of Delaware
Center for Applied Science and Engineering
1600 Rockland Road
Wilmington, DE 19899
(302) 651-6834

Florida
Jay E. Yourist
Department of Labor and Employment
Division of Vocational Rehabilitation
Bureau of Client Services
Rehabilitation Engineering Technology
1709-A Mahan Drive
Tallahassee, FL 32399-0696
(904) 488-6210

Georgia
Joy Kniskern
Georgia Department of Human Resources
Georgia Division of Rehabilitation Services
878 Peachtree Street, NE
Room 702
Atlanta, GA 30309
(404) 853-9151
(404) 894-7593

Hawaii
Laurie Hirohata
Project Director
HATS (Hawaii Assistive Technology System)
1000 Bishop Street, Suite 302
Honolulu, HI 96813
(808) 521-8489

Idaho
Bryce Fifield/Lee Parks
University Center on Developmental Disabilities
Professional Building
129 W. Third Street
Moscow Latah, ID 83843
(208) 885-6849

Illinois
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Illinois Assistive Technology Project
Department of Rehabilitation Services
Division of Planning and Special Initiatives
411 East Adams Street
Springfield, IL 62701
(217) 785-7091
(217) 522-7985

Indiana
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Indiana Department of Human Services
Office of Vocational Rehabilitation
Technology Assistance Unit
150 West Market Street
PO Box 7083
Indianapolis, IN 46207-7083
(317) 233-3394

Iowa
James C. Hardy
Director
Iowa Program for Assistive Technology
University Hospital School
Iowa City, IA 52242
(319) 353-6386
FAX (319) 356-8284

Kentucky
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Director
Kentucky Assistive Technology Service (KATS) Network
KATS Network Coordinating Center
427 Versailles Road
Frankfort, KY 40601
(502) 564-4665
(800) 327-KATS
FAX (502) 564-3976

Louisiana
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Louisiana State Planning Council on Developmental Disabilities
Department of Health and Hospitals
PO Box 3455
Baton Rouge, LA 70821-3455
(504) 342-6804

Maine
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Project Director
Division of Special Education
Maine Department of Education
State House Station #23
Augusta, ME 04330
(207) 621-3195
(207) 289-2550 (TDD)
FAX (207) 289-5900

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Governor's Office for Handicapped Individuals
300 West Lexington Street
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Baltimore, MD 21201
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FAX (301) 555-3280

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Children's Hospital
300 Longwood Avenue
Boston, MA 02116
(617) 735-7820
(617) 735-7301 (TDD)

Michigan
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Michigan Department of Education
Michigan Rehabilitation Services
PO Box 30010
Lansing, MI 48909
(517) 373-3391

Minnesota
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Star Program
Minnesota State Planning Agency
300 Centennial Building
658 Cedar Street
St. Paul, MN 55155
(612) 297-1554
FAX (612) 296-3698

Mississippi
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Department of Human Services
PO Box 1698
Jackson, MS 39215-1698
(601) 354-6891

Missouri
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UMKC, School of Education
5100 Rockhill Road
Kansas City, MO 64110
(816) 235-5337

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MonTech
Rural Institute on Disabilities
The University of Montana
52 Corbin Hall
Missoula, MT 59812
(406) 243-4597

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Assistive Technology Project
Nebraska Department of Education
Division of Rehabilitation Services
301 Centennial Mall South
PO Box 94987
Lincoln, NE 68509-4987
(402) 471-0735
(800) 742-7594
FAX (402) 471-2701

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#14, Ten Ferry Street
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Concord, NH 03301
(603) 224-0630

New Jersey
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New Jersey Department of Labor
Office of the Commissioner
Commissioner Raymond L. Bramucci
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Trenton, NY 08625
(609) 984-6550

New Mexico
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Assistance Program
435 St. Michael Drive, Bldg. D
Santa Fe, NM 87503
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TRAID Project
One ESP - 10th Floor
Albany, NY 12223-0001
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North Carolina
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Department of Human Resources
Division of Vocational Rehabilitation Services
1110 Navaho Drive, Suite 101
Raleigh, NC 27609
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Ohio
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Ohio Rehabilitation Services Commission
Division of Public Affairs
400 E. Campus View Blvd.
Columbus, OH 43235-4604
(614) 438-1236

Oklahoma
Paul Bowerman
Oklahoma Department of Human Services
Rehabilitation Services Division
DHS, RS #24
PO Box 25352
Oklahoma City, OK 73125
(405) 424-4311

Oregon
Gregory Fishwick
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Technology Access for Life Needs (TALN)
Oregon Vocational Rehabilitation Division
Department of Human Resources
2045 Silverton Road, NE
Salem, OR 97310
(503) 378-3830, ext. 386 (Voice/TDD)

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13th Street & Cecil B. Moore Avenue
Philadelphia, PA 19122
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South Carolina Vocational
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West Columbia, SC 29171-0015
(803) 822-5404

South Dakota
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Kneip Building
700 Governors Drive
Pierre, SD 57501
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Department of Mental Health
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3rd Floor, Doctors' Building
706 Church Street
Nashville, TN 37243-0675
(615) 741-7441

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The University of Texas at Austin
UAP of Texas
Department of Special Education
PO Box 7726
Austin, Travis County, TX 78713-7726
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Utah Assistive Technology Program (UATP)
Utah State University
Developmental Center for Handicapped Persons
Logan, UT 84322-6855
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FAX (801) 750-2044

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Department of Aging and Disabilities
Agency of Human Services
103 South Main Street
Waterbury, VT 05676
(802) 241-2620
FAX (802) 244-8103

Virginia
Kenneth H. Knorr, Jr.
Director
Virginia Assistive Technology System
Department of Rehabilitative Services
4901 Fitzhugh Avenue
PO Box 11045
Richmond, VA 23230
(804) 367-2445
(804) 367-0315 (TDD)
FAX (804) 367-9256
(800) 552-5019

West Virginia
Tom Minshall
Division of Rehabilitation Services
West Virginia Rehabilitation Services
Capital Complex
Charleston, WV 25301
(304) 766-4698

Wisconsin
Judi Trampf
Director, WisTech
Division of Vocational Rehabilitation
1 West Wilson Street, Room 950
PO Box 7852
Madison, WI 53702
(608) 267-6720
(608) 266-9599 (TDD)

Organizations/Agencies*

Activating Children Through Technology (ACTT)
c/o Western Illinois University
27 Horrabin Hall
Macomb, IL 61455
(309) 298-1634

This university-based center supports a technology resource center that offers information dissemination, training, and evaluation services in microcomputer applications and related technology areas to individuals who are disabled.

Alliance for Technology Access
Apple Computer, Inc.
20525 Mariani Avenue, MS 43S
Cupertino, CA 95014
(415) 528-0747

The alliance was developed in association with the Disabled Children's Computer Group by Apple Computer's Office of Special Education Programs. This organization conducts research and provides information dissemination, database resources, referral services, and training related to the implementation of microcomputer technology with children and adults who are disabled. The alliance currently is developing model assistive technology sites across the United States.

American Occupational Therapy Association (AOTA)
1383 Piccard Drive
PO Box 1725
Rockville, MD 20850-0822
(301) 948-9626

American Physical Therapy Association (APTA)
1111 N. Fairfax
Alexandria, VA 22314
(703) 684-2782

American Speech-Language-Hearing Association (ASHA)
10801 Rockville Pike
Rockville, MD 20852-3279
(800) 638-6868 (members) (voice or TDD)
(800) 638-8255 (consumers) (voice or TDD)

* This listing was compiled by the American Speech-Language-Hearing Association (ASHA). It does not attempt to be all-inclusive nor does it imply ASHA endorsement.

Apple Computer, Office of Special Education
20525 Mariani Avenue, MS 43S
Cupertino, CA 95014
(408) 974-8601

Through this office, Apple Computer works with rehabilitation, education and advocacy organizations nationwide to identify computer-related needs of individuals who are disabled and to assist in the development of responsive programs. Apple maintains a database of hardware, software, publications, and organizations involved in the use of assistive technology.

Association for Retarded Citizens (ARC)
ARC National Headquarters
500 E. Border
Suite 300
Arlington, TX 76010
(817) 261-6003
(817) 277-0553 (TDD)

ARC is the nation's largest volunteer organization solely devoted to improving the lives of all children and adults with mental retardation and their families. The association also fosters research and education regarding the prevention of mental retardation in infants and young children.

Blissymbolics Communication International
250 Ferrand Drive, Lower Concourse
Don Mills, Ontario M3C 3P2 Canada
(416) 421-8377

This organization is dedicated to the development and dissemination of Blissymbolics as a communication system for people who do not speak.

Carolina Literacy Center
Department of Medical Allied Health Professions
Campus Box #8135
University of North Carolina at Chapel Hill
Chapel Hill, NC 27599-8135
(919) 966-7486

In addition to other services, this center strives to meet the needs of people with severe speech and physical impairments through literacy symposiums/workshops and to make available publications on the topic of literacy.

Closing the Gap, Inc.
PO Box 68
Henderson, MN 56044
(612) 248-3294

This organization offers regional and national conferences, workshops, and training. CTG also publishes a newspaper dedicated to the application of assistive technology with individuals who are disabled.

Committee on Personal Computers and the Handicapped (COPH-2)
PO Box 7701
Chicago, IL 60680-7701
(708) 866-8195

This consumer organization disseminates information, provides technical consultations, and sells adaptive computer devices. The organization also publishes information resources and supports an electronic bulletin board.

Hear Our Voices
105 W. Pine Street
Wooster, OH 44691
(216) 262-4681

A national patient advocacy group run by Prentke Romich Company. Any augmentative communication aid user or family member can join this organization.

IBM National Support Center for Persons with Disabilities (IBM-NSCPD)
PO Box 2150
Atlanta, GA 30055
(800) 426-2133

This IBM support center provides information, referral, advocacy, and demonstration center services. The center provides specific IBM computer applications and resources for individuals who are disabled.

International Society for Augmentative and Alternative Communication (ISAAC)

United States Society for Augmentative and Alternative Communication (USSAAC)
PO Box 1762, Station R
Toronto, Ontario M4G 4A3 Canada
(416) 737-9308

The purpose of these organizations is to facilitate the international and national advancement of the transdisciplinary field of augmentative and alternative communication.

National Federation for the Blind
1800 Johnson Street
Baltimore, MD 21230
(301) 659-9314

A national organization with more than 500 state and local chapters. The organization provides information dissemination, advocacy, referral services, database, and resource support services to persons who are visually impaired.

National Lekotek Center
CompuPlay
711 E. Colfax
South Bend, IN 46617
(219) 233-4366

CompuPlay provides computer play sessions for family members and children with special needs ages 2 to 14. Adaptive equipment and software are employed to allow children to play and learn. The organization provides a software lending library and computer demonstration center.

RESNA – Association for the Advancement of Rehabilitation Technology
1101 Connecticut Avenue, NW, Suite 700
Washington, DC 20036
(202) 857-1199

RESNA plans and conducts scientific, technical, and educational meetings and programs; serves as a forum for the development of standards, terminology, and guidelines; and provides consultation and coordination concerning matters of interest to RESNA members. It also publishes and disseminates information on technology and service delivery.

TASH – The Association for Persons with Severe Handicaps
11201 Greenwood Avenue North
Seattle, WA 98133
(206) 361-8870

The purpose of TASH is to create a community where no one is segregated and everyone belongs. TASH is dedicated to research, education, dissemination of knowledge and information, legislation, litigation, and excellent services.

Technology and Media Division (TAM)
Council for Exceptional Children
1920 Association Drive
Reston, VA 22091-1589
(703) 620-3660

This division of the Council for Exceptional Children keeps abreast of advances in special education technology. The organization provides information dissemination and referral services and offers several publications on the use of technology.

Trace Research and Development Center
1500 Highland Avenue, S-151 Waisman Center
Madison, WI 53705
(608) 262-6966
(608) 263-5408 (TDD)

The Trace Center develops and disseminates information related to nonvocal communication, computer access, and technology to aid individuals who are disabled. The center also conducts research and training in technology.

UCLA Intervention Program for Handicapped Children
1000 Veteran Avenue, Room 23-10
Los Angeles, CA 90024
(213) 825-4821

This university-based technology program has developed software for use with individuals who are disabled. The program also supports a resource center and is actively involved in technology training activities.

Periodicals*

Accent on Living
Published by
Cheever Publishing
PO Box 700
Bloomington, IL 61701

American Journal of Audiology: A Journal of Clinical Practice
Published by the
American Speech-Language-Hearing Association (ASHA)
10801 Rockville Pike
Rockville, MD 20852-3279
(301) 897-5700 (voice or TDD)

American Journal of Speech-Language Pathology: A Journal of Clinical Practice
Published by the
American Speech-Language-Hearing Association (ASHA)
10801 Rockville Pike
Rockville, MD 20852-3279
(301) 897-5700 (voice or TDD)

American Occupational Therapy Journal
Published by the
American Occupational Therapy Association
1383 Piccard Drive
Rockville, MD 20850-0822
(301) 948-9626

Assistive Device News
Newsletter published by
Central Pennsylvania Special Education Regional Resource Center
150 S. Progress Avenue
Harrisburg, PA 17109
(717) 657-5840

Assistive Technology
Published by
Demos Publications
156 Fifth Avenue, Suite 1018
New York, NY 10010
(212) 857-1199

Assistive Technology Quarterly
Published by
RESNA Press
1101 Connecticut Avenue NW, Suite 700
Washington, DC 20036
(202) 857-1140

Augmentative and Alternative Communication (AAC)
Sponsored by the
International Society for Augmentative and Alternative Communication (ISAAC)
Published by
Decker Periodicals Publishing, Inc.
PO Box 620, Station A
Hamilton, Ontario L8N 3K7 Canada
(416) 522-7017

Augmentative Communication News
Published by
Augmentative Communication, Inc.
One Surf Way, Suite #215
Monterey, CA 93940
(408) 649-3050

Closing the Gap
Newspaper
Address correspondence to:
Closing the Gap
PO Box 68
Henderson, MN 56044
(612) 248-3294

Communication Outlook
An Affiliate of ISAAC.
Published by
Communication Outlook
Artificial Language Laboratory
Michigan State University
405 Computer Center
East Lansing, MI 48824-1042
(517) 358-0870

Communicating Together
An affiliate of ISAAC.
Published by
Sharing to Learn
PO Box 986
Thornhill, Ontario L3T 4A5 Canada

Computer-Disability News
Published by
National Easter Seal Society
5120 S. Hyde Park Blvd.
Chicago, IL 60615
(312) 667-8400

* This listing was compiled by the American Speech-Language-Hearing Association (ASHA). It does not attempt to be all-inclusive nor does it imply ASHA endorsement.

Computer Teacher (The)
Published by
International Society for Technology in Education
1787 Agate Street
Eugene, OR 97403-1923
(503) 346-4414

Educational Technology
Published by
Educational Technology
720 Palisade Avenue
Englewood Cliffs, NJ 07632
(201) 871-4007

Exceptional Parent
Published by
Boston University, School of Education
605 Commonwealth Avenue
Boston, MA 02215

Journal of Applied Behavior Analysis (JABA)
Published by the
Society for the Experimental Analysis of Behavior, Inc.
Address correspondence to
Business Manager, Mary Louise Wright
Department of Human Development
University of Kansas
Lawrence, KS 66045

Journal of Speech and Hearing Research (JSHR)
Published by the
American Speech-Language-Hearing Association (ASHA)
10801 Rockville Pike
Rockville, MD 20852-3279
(301) 897-5700 (voice or TDD)

The Journal of the Association for Persons with Severe Handicaps (JASH)
Published by the
Association for Persons with Severe Handicaps (TASH)
7010 Roosevelt Way, NE
Seattle, WA 98115

Language, Speech, and Hearing Services in Schools (LSHSS)
Published by the
American Speech-Language-Hearing Association (ASHA)
10801 Rockville Pike
Rockville, MD 20852-3279
(301) 897-5700 (voice or TDD)

Physical Therapy
Published by the
American Physical Therapy Association
1111 N. Fairfax
Alexandria, VA 22314
(703) 684-2782

Research in Developmental Disabilities
Published by
Pergamon Press, Inc.
Maxwell House
Fairview Par
Elmsford, NY 10523
or
Pergamon Press plc
Headington Hill Hall
Oxford OX3 0BW, England

Team Rehab Report
Published by
Miramar Publishing Company
6133 Bristol BHW
PO Box 3640
Culver City, CA 90231-3640
(213) 337-9717
(800) 543-4116

Technology and Disability
Published by
Andover Medical Publishers, Inc.
80 Montvale Avenue
Stoneham, MA 02180
(800) 366-2665

Topics in Language Disorders
Published by
Aspen Publishers, Inc.
7201 McKinney Circle
Frederick, MD 21701
(800) 638-8437

TRACES Newsletter
Published by
Teaching Research Division
Western Oregon State College
345 N. Monmouth Avenue
Monmouth, OR 97361
(503) 838-8778

VOICES
Newsletter published by
Hear Our Voices
105 West Pine Street
Wooster, OH 44691
(216) 262-4681

Funding Resources*

Assistive technology: A funding workbook **(1991)**
By: Morris, M., & Golinker, L.
RESNA Technical Assistance Project
1101 Connecticut Avenue, NW, Suite 700
Washington, DC 20036
(202) 857-1140

Part I of this workbook is a road map to funding sources, and Part II is an outline of federal laws and rules.

Funding excuses **(1991)**
By: Golinker, L.
United Cerebral Palsy Associations
1522 K Street,
Suite 1112
Washington, DC 20005
(800) 872-5827

This free memorandum lists 17 common "excuses" offered by four funding programs to deny requests for augmentative and/or alternative communication devices and services in particular, and many other types of assistive technology in general. The four funding programs are Medicaid, special education, vocational rehabilitation, and private insurance. A response is provided for each excuse. The intent is to help in preparing initial applications so that funding will be approved and to provide a strategy for appealing an initial funding denial.

Assistive technology and the Individualized Education Program **(1992)**
By: RESNA Technical Assistance Project
RESNA Technical Assistance Project
1101 Connecticut Avenue NW, Suite 700
Washington, DC 20036
(202) 857-1140

This product provides information on how to incorporate assistive technology into an IEP for children and youth with disabilities.

Handbook of assistive technology **(1992)**
By: Church, G., & Glennon, S. (Eds.)
Singular Publishing Co.
4284 41st Street
San Diego, CA 92105-1197
(619) 521-8000

The many faces of funding **(1986)**
By: Hofman, A.
Phonic Ear, Inc.
250 Camino Alto
Mill Valley, CA 94941
(415) 383-4000

This textbook focuses on funding strategies for communication devices. The information it gives is also applicable to funding for other types of assistive technology aids. It highlights sources of funding on the federal, state, local, educational, and private levels.

Medicaid coverage of AAC **(available late fall 1992)**
By: Golinker, L.
United Cerebral Palsy Associations
1522 K Street, Suite 1112
Washington, DC 20005
(800) 872-5827

This free set of materials explains Medicaid coverage of augmentative and alternative communication through Early Periodic Screening, Diagnostic, and Treatment Services (EPSDT); existing state policies regarding AAC coverage; and model complaints to gain AAC coverage through Medicaid/EPSDT. The materials will be distributed to UCPA affiliates, state Protection and Advocacy Groups, federally funded state Assistive Technology Centers, and state Developmental Disabilities Planning Councils. They may also be obtained by calling UCPA at the number listed above.

Summary of Existing Legislation Affecting Persons with Disabilities (1992)
By: Department of Education
Clearinghouse on Disability Information
U.S. Department of Education
Room 3132 Switzer Building
Washington, DC 20202-2524
(202) 732-1241 (voice or TDD)
(202) 732-1723 (voice or TDD)

This booklet describes many federal laws and programs that affect people with disabilities.

* This listing was compiled by the American Speech-Language-Hearing Association (ASHA). It does not attempt to be all-inclusive nor does it imply ASHA endorsement.

Databases*

Database resources are large clearinghouses for information on a wide variety of assistive technology, including new and existing hardware, software, and related resources. These databases provide information via on-line electronic networks, floppy disks, CD-ROM, audiocassettes or printed material.

ABLEDATA—Database of Assistive Technology Information
National Rehabilitation Information Center (NARIC)
(operated by Macro International Inc.)
Silver Spring Centre
8455 Colesville Road, Suite 935
Silver Spring, MD 20910
(800) 346-2742
(301) 588-9284

ABLEDATA is an extensive database that contains listings of assistive technology available both commercially and non-commercially from domestic and international manufacturers and distributors. It is an information system that enables people with disabilities and their families to identify and locate devices that will assist them at home, work, school, and in the community; it also serves as a resource for practitioners, researchers, engineers, and advocates in the rehabilitation field.

Some of the areas that can be searched in the database are mobility, seating, communication, and environmental controls. Database citations provide product brand name and generic name, manufacturer name and address, price, and a detailed description of the product. Search results are available in regular print, enlarged print, Braille, audio cassettes, diskettes, CD-ROM, and in Spanish. The ABLEDATA classified service is also available for buying or selling used assistive devices or equipment.

Accent on Information
PO Box 700
Bloomington, IL 61702
(309) 378-2961

A computerized database of product, publication, and related resource information on how to adapt assistive technology equipment. The database contains over 6,000 product entries.

Access/Abilities
PO Box 458
Mill Valley, CA 94942
(415) 388-3250

A database of technology resources for individuals who are physically disabled. The database contains information on services, hardware, and software aids.

Assistive Device Database System
Assistive Device Center
California State University
Sacramento, CA 95819
(916) 278-6422

This database contains information on assistive devices and related resource listings. It focuses on the educational implications of using assistive technology with disabled populations.

Adaptive Device Locator System
Academic Software, Inc.
331 West Second Street
Lexington, KY 40507
(606) 233-2332

This floppy-disk-based system provides descriptions and pictures of assistive devices and lists of sources for products and product information. The system can generate mailing labels and form letters to vendors. The database includes over 600 generic device descriptions, categorized by over 350 functional goal descriptions and cross-indexed with over 300 vendors.

Compuserve
5000 Arlington Centre Blvd.
PO Box 20212
Columbus, OH 43220
(614) 457-8600

The system contains a users' database that contains information on all aspects of technology used by individuals who are disabled.

* This listing was compiled by the American Speech-Language-Hearing Association (ASHA). It does not attempt to be all-inclusive nor does it imply ASHA endorsement.

DEAFNET
508 Bremer Bldg., 7th and Roberts Streets
St. Paul, MN 55101
(612) 223-5130

DEAFNET is a nonprofit organization that serves technology users who are hearing impaired. It has a nationwide electronic mail service with international links.

ECER
Council for Exceptional Children
1920 Association Drive
Reston, VA 22091-1589
(703) 620-3660

ECER is the ERIC database for technology users who are disabled. The database contains bibliographic information on books, articles, teaching materials, and reports on the education of individuals who are disabled.

Handicapped Education Exchange (HEX)
11523 Charlton Drive
Silver Spring, MD 20902
(301) 681-7372

The HEX database offers resource information on the use of technology with individuals who are disabled. The database contains information on products, organizations, and related information on training and service.

HYPER-ABLEDATA-PLUS
Trace Center Reprint Service
1500 Highland Avenue, S-151 Waisman Center
Madison, WI 53706
(608) 263-6966

The CD-ROM version of the on-line version of ABLEDATA. This disk provides information on over 16,000 assistive technology products. The system also provides pictures and sound samples of many database items, and it has an access system for users who are blind or visually impaired.

National Technology Center
American Foundation for the Blind, Inc.
15 W. 16th Street
New York, NY 10011
(212) 620-2000

The center maintains three database systems: National Technology Database, Evaluations Database, and Research and Development Database. Each database focuses on resources for individuals who are blind or visually impaired and professionals who work with them.

Solutions
Apple Computer, Inc.
20525 Mariani Avenue, MS 43S
Cupertino, CA 95014
(408) 973-2732

The database contains information on hardware, software, organizations, and publications maintained by Apple Office of Special Education Programs. The database can be accessed via SpecialNet or AppleLink.

SpecialNet
2021 K Street, NW, Suite 215
Washington, DC 2006
(202) 835-7300

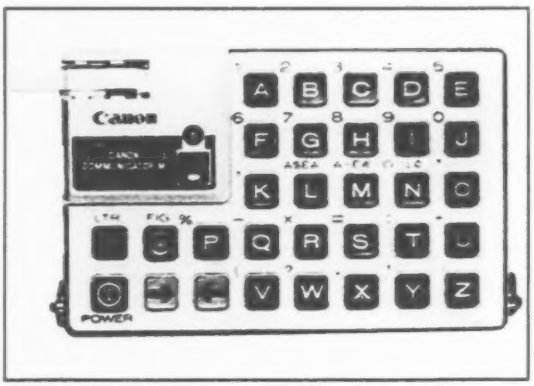
The largest computer network in the United States devoted exclusively to the information needs of professionals in special education.

Appendix B Examples of High Tech Devices

Product Name: ALLTALK
Size: 16" x 20" x 2" or 10" x 15" x 2"
Weight: 9 lbs. (16" x 20") or 7.5 lbs. (10" x 15")
Power Source: Rechargeable batteries
Manufacturer: Adaptive Communication Systems, Inc.
1400 Lee Road
Coraoplis, PA 15108
(800) 227-2922

Alltalk is a human-quality voice output communicator and training aid. Alltalk's membrane keyboard may be programmed to have from one to 128 positions. Voice output for each position is programmed by touching the position and speaking the desired phrase into a microphone. Alltalk stores the phrase by digitally encoding it (the voice is not synthesized), and words in any language, sounds, and music may be recorded and played back. When the user presses a programmed position, the programmed sound or speech is immediately played back. All words, phrases, or sounds may be changed at any time by simply repeating the programming procedure. The user may design overlays in any desired manner to correspond to programmed messages. The size of each area of selection is also definable. Different vocabularies can be stored on a standard tape recorder. There are two versions of Alltalk: Level 1 (600 word vocabulary) and Level 4 (1200 words). There are also two sizes: 16" x 20" x 2" (9 lbs.) and 10" x 15" x 2" (7.5 lbs.). Options include wheelchair mounting systems, carrying cases and keyguards.

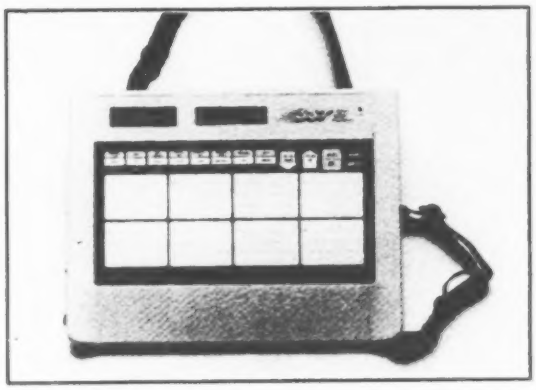
Product Name: CANON COMMUNICATOR M
Size: 3.3" x 5.2" x 1.2"
Weight: 9.2 oz.
Power Source: Rechargeable battery pack
Manufacturer: Canon USA Inc.
One Canon Plaza
Lake Success, NY 11042
(516) 488-6700



The Canon Communicator M is a portable communication aid that offers 190 keyboard functions and printed tape output. The A, B, C, D, and E keys may be used to store words or phrases of up to 19 characters each. Messages or phrases stored may be changed at any time by the user. The Canon Communicator M may be used as an alternate input to a computer with a serial interface. Output from the Canon Communicator M is to a thermal dot printer. Input is made via direct selection. Keyguards, wheelchair mounting, raincover, arm belts, and other accessories are available for the Canon Communicator M. The aid may be interfaced to an IBM computer.

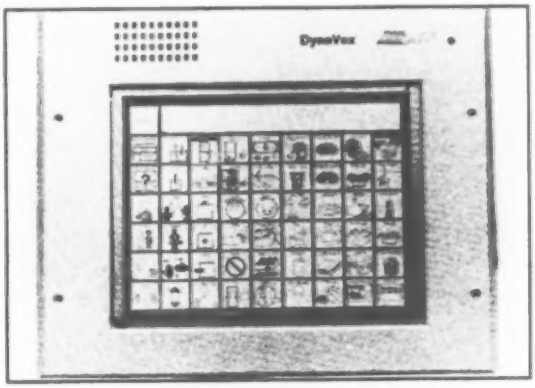
Many thanks to the Trace R&D Center, University of Wisconsin, Madison, for it generous contribution of pictures and text for this section. Thank you also to AbleNet, Inc., Prentke Romich Company, Sentient Systems, Inc., and Words+, Inc., for their contributions

Product Name: DIGIVOX
Size: 11.75" x 8.75" x 1.5"
Weight: 3 lbs. 8 oz.
Power Source: Rechargeable batteries
Manufacturer: Sentient Systems, Inc.
5001 Baum Boulevard
Pittsburgh, PA 15213
(800) 344-1SST



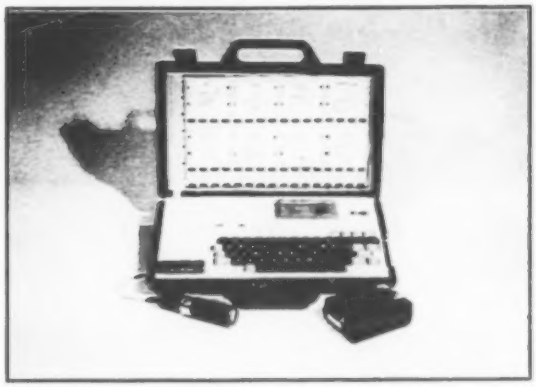
The DigiVox is a digitized speech device. It has 4 levels and 4 ways of assembling messages: single "area", picture sequencing, spell sequencing, and linking. The DigiVox can be used by touching the touch panel, or with visual or auditory scanning. The DigiVox comes with paper overlays. Messages can be saved to an option al disk drive to create a "library" for communication.

Product Name: DYNAVOX
Size: 13.2" x 10.6" x 3"
Weight: 10.5 lbs.
Power Source: Rechargeable batteries
Manufacturer: Sentient Systems, Inc.
5001 Baum Boulevard
Pittsburgh, PA 15213
(800) 344-1SST



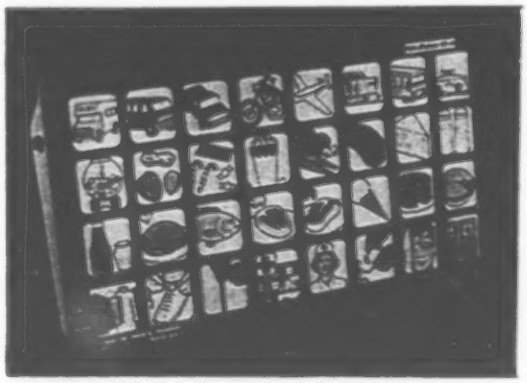
The DynaVox is a dynamic, voice output communication device presenting symbols, letters and numbers. With its dynamic display, the user progressively "zeroes in" on a desired intent by making selections from successive screens. The touch–activated screen allows for easy arrangement of keyboards with different sized keys and key layouts. Users can choose from over 30 different screen layout templates. Up to 60 keys are available on a single screen. The touch panel can be used with either touch-enter or touch-exit, with control over length of touch activation. Auditory scanning, joystick, single and dual switch scanning methods are built in. Application programs include ones which have over 1,000 symbols and over 2,000 symbols (DynaSyms) created by Faith Carlson. This program offers optional animation of action words, yes and no. Over 5,000 keys can be stored in the standard, internal memory and over 20,000 keys with the optional memory expansion. The Dynavox uses DECtalk, giving a choice of nine voices, and digital speech capabilities. Two serial ports permit access to printer, computer and environmental controls. Available accessories include a carrying case, keyguard, mounting system, wrist rest, anti-glare shield, moisture guard, RAM DynaCard for internal memory backup, 2nd switch cable, and a cable for print output.

Product Name: EVALPAC WITH REALVOICE
Size: 14.75" x 8.5" x 1.75"
Weight: 8.5 lbs.
Power Source: Rechargeable batteries
Manufacturer: Adaptive Communication Systems Inc.
1400 Lee Road
Coraoplis, PA 15108
(800) 227-2922



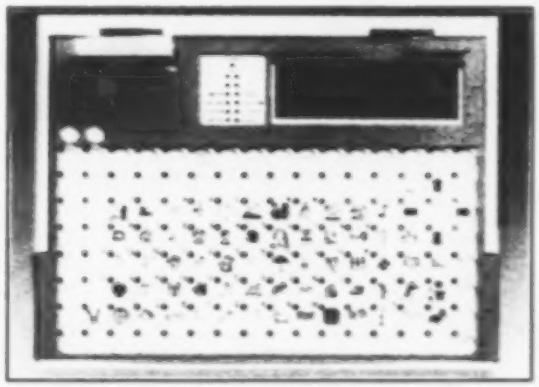
The EvalPAC is a communication aid that has Adaptive Communication Systems' RealVoice built in. RealVoice is a full-featured, diphone-based voice synthesizer with more natural rhythm and intonation available in either male or female voice. The keyboard may be configured to adjust for user abilities. Additional features include: a text-to-speech capability permitting messages to be typed or selected and spoken or printed; an abbreviation expansion program allowing storage and recall of messages; capability of assigning voice output to single picture selection or picture sequencing of up to 5 symbols; built-in push button telephone dialing, adjustable time delays and volume control; internal clock; and ability to store programs and vocabulary on tape. Fifteen memory levels are available. Memory capacity is 27,000 characters. Options include environmental controls, alternative keyboards, and wheelchair mounting systems; contact manufacturer for details.

Product Name: INTROTALKER
Size: 13" x 7" x 3"
Weight: 5 lbs.
Power Source: Rechargeable batteries
Manufacturer: Prentke Romich Company
1022 Heyl Road
Wooster, OH 44691
(800) 642-8255
(216) 262-1984



IntroTalker is a portable communication and training device with human-quality voice output. The IntroTalker is designed for high-intelligibility speech with a somewhat limited vocabulary. The user presses one or a combination of the IntroTalker's 32 keys and a pre-stored word or phrase is spoken. The words and phrases are stored in the IntroTalker by a speaking person who recites them into the device's microphone. The sounds are recorded digitally and played back when the appropriate keys are pressed. The standard unit includes sufficient memory for two minutes of extended speech or one minute of normal speech. Additional memory can be added to extend the capacity to eight minutes of extended speech. Vocabulary can be accessed using a simplified form of the Minspeak method used on the Light Talker and Touch Talker communication aids. Pressing keys requires four ounces of force. Up to three additional memory modules may be purchased, permitting the recording of up to 60 short phrases each. A trade-in policy is available for upgrading to the more powerful Touch Talker communication aid. Models of IntroTalker which have remote switch and scanning capabilities are also available; contact the manufacturer for details.

Product Name: LIBERATOR
Size: 13.75" x 18.38" x 3.75"
Weight: 7 lbs. 4 oz.
Power Source: Rechargeable batteries
Manufacturer: Prentke Romich Company
1022 Heyl Road
Wooster, OH 44691
(800) 642-8255
(216) 262-1984



Liberator is a powerful and flexible communication device. It is appropriate for virtually all ages and cognitive levels. Liberator's keyboard allows operation by touch, by headpointing, or by switch-activated scanning. For high functioning users, predictive scanning, text editing functions, notebooks, and a printer permit faster, more efficient communication. Liberator's user friendly menus make it easy to configure the system. Audible scanning and audible menu feedback permit people with visual impairments to use a communication device more effectively than ever before. Liberator offers four separate user areas, allowing clinicians to use the same device to evaluate or train multiple users.

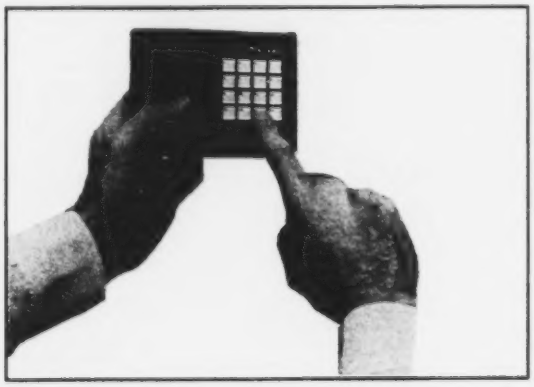
Product Name: MACAW-SC
Manufacturer: Zygo Industries Inc.
PO Box 1008
Portland, OR 97207-1008
(503) 684-6006
(800) 234-6006

Macaw-SC is a portable communication aid that can record messages digitally and replay them. Messages may be accessed either directly through the MACAW-SC keyboard or by using scanning mode with external switches (extra). The keyboard may be configured to have from 2 to 32 keys. The standard configuration permits 32 messages to be stored (one minute of high-quality recording or two minutes of extended play); memory may be acquired to expand capability to up to 4.5 minutes of high quality or 9 minutes of extended play. The ultimate number of messages depends on the amount of memory acquired. Options (extra) include keyguards, enlarged-key keyboards, and full color key labels; contact manufacturer for further information.

Product Name: MESSAGEMATE
Manufacturer: Words+, Inc.
P.O. Box 1229
Lancaster, CA 92584
(805) 949-8331
(800) 869-8521 (US/Canada)

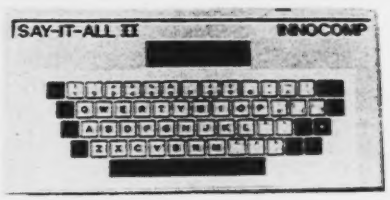
MessageMate is a small easy–to–use communication device with high quality recorded sound capability. The membrane keys are 3/4" square. Any symbols may be used. Keyboard selection includes adjustable key acceptance time and 20 or 40 keys. Scanning is provided in either linear or column–row fashion using 1 or 2 switches.

Product Name: PARROT
Size: 5.25" x 4" x 1.5"
Weight: 13 oz.
Power Source: Rechargeable batteries
Manufacturer: Zygo Industries Inc.
PO Box 1008
Portland, OR 97207-1008
(503) 684-6006
(800) 234-6006



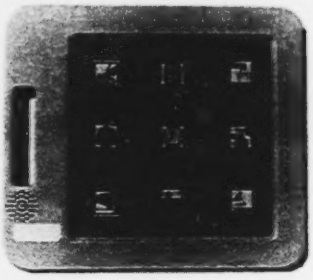
The Zygo Parrot is a communication aid that uses digitized recordings to provide voice output. The recorder/playback unit has enough recording time for 16 brief messages. A built-in microphone and neckstrap are provided. The Parrot-JK provides for external connection to individual switches or scanning systems.

Product Name: **SAY-IT-ALL II PLUS**
Size: 15" x 7" x 1.5"
Weight: 2.25 lbs.
Power Source: Rechargeable battery
Manufacturer: Innocomp
Innovative Computer Applications
33195 Wagon Wheel
Solon, OH 44139
(216) 248-6206



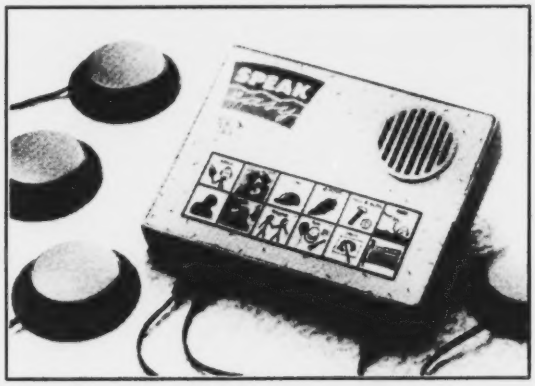
Say-It-All II Plus is a portable communication aid with synthesized voice output. The user types words or phases on the Say-It-All's membrane keyboard. These words or phrases are then converted to correct English phonetic pronunciation and spoken by a built-in speech synthesizer. The user can change the pitch of the voice from low to high. Messages can be sent to a printer or computer via a built-in RS232 serial port. The surface of the keyboard is flat, seamless and moisture-proof. Up to 846 whole words or phrases may be stored and recalled. The user stores phrases by spelling them out, and recalls them by pressing a few keys. Overlays containing words, symbols or pictures can be created and placed on the keyboard to show the location of vocabulary items. MSL II software (included) allows phrases to be stored on levels or pages. The Say-It-All II Plus includes a manual, battery charger, liquid crystal display, set of nine overlays, and Touch 'N Talk Micro Communication Stickers. Options (extra) include a keyguard, additional overlays and stickers, an external printer, Clarity, a speech synthesizer that enables use of male, female, or child voices, Voc-Load software which is IBM compatible, and CARE software which has abbreviation expansion, semantic compaction, and logical letter coding capabilities.

Product Name: **SAY-IT-SIMPLY PLUS**
Size: 19" x 17" x 1.5"
Weight: under 6 lbs.
Power Source: Rechargeable battery
Manufacturer: Innocomp
Innovative Computer Applications
33195 Wagon Wheel
Solon, OH 44139
(216) 248-6206



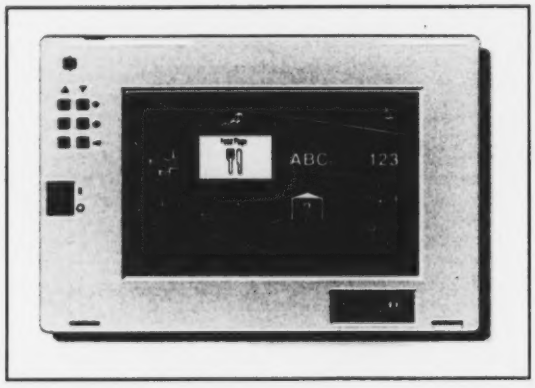
Say-It-Simply Plus is a portable communication aid with synthesized voice output and a user-definable keyboard area. The keyboard of the Say-It-Simply is a 12" x 12" membrane surface. The user can define how many areas this keyboard is divided into, from one to 144 areas. Particular vocabulary can be programmed for each area. When that area is pressed, the programmed word or phrase is spoken by a built-in speech synthesizer. Multiple vocabularies (up to 28) can be created and stored, with a total capacity of 762 words or phrases. Overlays can be created for different vocabulary sets. The voice pitch may be changed from low to high. MSL II software (included) permits phrases to be stored in levels. A built-in RS 232 serial port allows the device to be attached to a printer or computer. Say-It-Simply Plus includes a manual, battery charger, instructional overlay with attached frame, set of five overlays, and Pick 'N Stick Color Pack Communication Stickers. Options include keyguards, additional overlays, overlays with frames, and stickers, an external printer, and Clarity, a speech synthesizer that permits choice of male, female, or child voice.

Product Name: SPEAKEASY
Size: 8" x 6" x 3"
Weight: under 3 lbs.
Power Source: Rechargeable battery
Manufacturer: AbleNet,, Inc.
1081 Tenth Avenue, S.E.
Minneapolis, MN 55414
(800) 322-0956



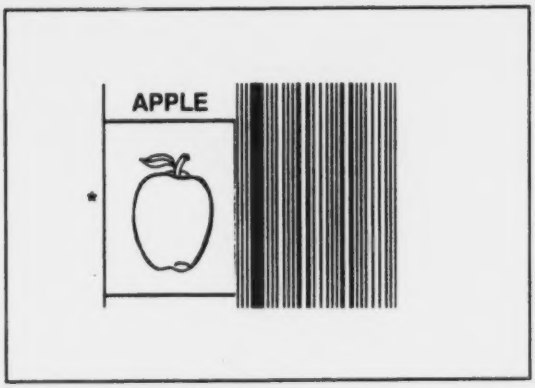
SpeakEasy is a digitized voice output communication device. It stores up to 12 messages with a total of 2 minutes recording time. Messages are activated using the built-in keyboard, or via external switches. Each message sounds just like the person who recorded it. The case is made of high-impact plastic, and is splash resistant. SpeakEasy comes with an AC adapter and a detachable shoulder strap.

Product Name: SYSTEM 2000
Size: 12.4" x 8.6" x 1.6"
Weight: 6 lbs.
Power Source: Rechargeable battery
Manufacturer: Words+, Inc.
P.O. Box 1229
Lancaster, CA 92584
(805) 949-8331
(800) 869-8521 (US/Canada)



System 2000 represents the state–of-the–art in augmentative communication. Every major language strategy and access method in use today is provided in a portable system. Language strategies include pictographic symbols, auditory scanning, and letters and words. Access methods which can be used with System 2000 include single switch, direct select (touch window), mouse, trackball, touch tablet, optical pointer, and joystick. Both digitized sound and high quality synthesized speech are available.

Product Name: TIGER JR.
Size: 7" x 10" x 2"
Weight: 2.7 lbs.
Manufacturer: TIGER Communication System Inc.
155 East Broad St. #325
Rochester, NY 14604
(716) 454-5134



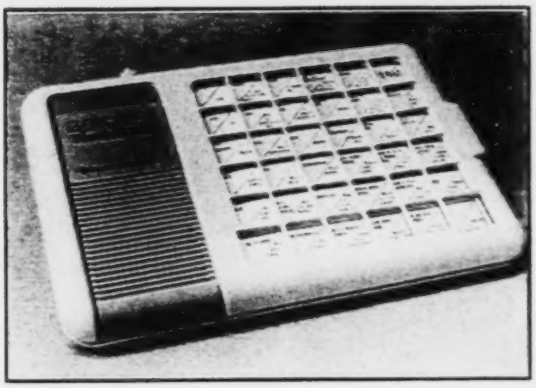
The TIGER Jr. is a picture communication book with talking bar codes that interfaces with the magic wand bar code reader. The TIGER Jr. has a survival-oriented vocabulary of 375 words displayed with combined pictures and talking bar codes. The line drawings emphasize concreteness and body language. The 56 laminated pages of the TIGER Jr. feature semantic color-coding and functional page tabs with icons arrayed in a keyboard-like manner. Bar codes average 2.75 inches tall, and may be photocopied and enlarged for non-commercial purposes up to 10 inches tall while remaining machine readable. The pages come in a binder which has an attached strap for carrying and a Velcro binder flap fastener. A Magic Wand Speaking Reader is required to give voice output of the bar codes. The TIGER Jr. is $85; the cost of the TIGER Jr. and the Magic Wand together is $150. Protected space within the 3-ring binder permits the attachment of a compact user-supplied LCD display keyboard device or calculator. An optional TIGERbook Expansion Vocabulary Set increases the lexicon to 940 words and is available for $25.

Product Name: VOIS 160 WITH P.A.L.L.S. SOFTWARE
Size: 8.75" x 16.5" x 3.18"
Weight: 5 lbs.
Power Source: Rechargeable batteries
Manufacturer: Phonic Ear Inc.
250 Camino Alto
Mill Valley, CA 94941
(415) 383-4000

VOIS 160 is an electronic communication aid that generates synthesized speech. Words and phrases can be typed in and may be saved under a specific key location or as a sequence of keys. The VOIS 160 has a flat membrane keyboard that can be configured to contain up to 104 keys; key size is variable. The device may also be attached to any computer that has an RS232 interface; commands from the computer for programming and saving vocabulary to a backup file can be accepted by the VOIS 160. There are two software systems which can be used with this device: P.A.L.L.S. and VoisShapes. P.A.L.L.S. features a Three Talk Buffers function which permits separate conversations to be conducted simultaneously; the user can switch among the three buffers. The contents of the Talk Buffers can also be viewed on an internal display screen and edited. VoisShapes provides keyboard emulation including editing functions. The software also has hot keys (which recall frequently used words), grabber keys (which immediately interrupt any mode to speak a message), and grammatical keys. Options (extra) include keyguards for 8, 24, or 104 keys, a carrying case, and edit, emulation, and back up software packages for programming the VOIS 160. Contact manufacturer for further information.

Product Name: WOLF
Size: 14.5" x 10" x 1.75"
Weight: 5 lbs.
Power Source: Rechargeable batteries
Manufacturer: Wayne County Regional Education Service Agency

Attention: Greg Turner
33500 Van Born Road
Wayne, MI 48184
(313) 467-1610



WOLF is a portable communication aid with synthesized voice output. Four memory sections are included. The first is a User Section that is programmable by the user via either a 400 word "dictionary" of preprogrammed entries or a "phoneme page." The User Section has a capacity of approximately 800 words, organizable into as many as 36 levels. The Fixed Section, which has a maximum capacity of 500 words organizable into up to 36 levels, is programmed by the manufacturer per user specifications. The two additional sections can be left blank for extra User Sections or used as extra Fixed Sections with additional programmed vocabulary (extra). A canned demonstration vocabulary (400 words, 10 levels) is included and comes with copies of picture overlays. A built-in volume control is activated by touchpanel command. A scanning version of WOLF, called SCANWOLF, is also available.

Appendix C Graphic Symbol Sets and Systems

Graphic symbols may be categorized according to their type of symbolic representation (McNaughton, 1989) as follows:

Letter-sound relationships

- *Rebus*: Originally developed to provide a mechanism for teaching young children without disabilities to learn to read. These pictographs represent words or syllables by pictures of objects or by symbols whose names resemble the intended words or syllables in sound. It is based upon an assumption that children using these pictographs possess phonetic skills.

Portrayal of body movement, hand shape, and/or sign or gesture

- *Sigsymbols*: Developed in a classroom setting for use with students with severe cognitive disabilities. Sigsymbols consist of pictographs, ideographs, and sign–linked symbols, and thus are related to both manual signs and graphic symbols. Sigsymbols are useful for individuals using manual signs to communicate because signing is relevant to a number of the Sigsymbols. The simplicity of Sigsymbols allows clinicians, teachers, and family members to quickly draw them during communication interactions when the appropriate symbols are not readily available.

Picture-based—direct representation, pictures and line drawings

- *Picture Communication Symbols*: Developed for children with mental retardation and autism as a simple, generic, iconic picture set. Over 1,700 symbols (two sizes) represent vocabulary that enables targeted populations to carry on everyday conversations. Available are:
  - two dictionaries of symbols printed on colored or white paper,
  - stamps,
  - other supportive instructional materials, and
  - computer programs that generate symbols on the Macintosh using Hypercard (Board-maker and Board Builder).
- *Oakland Schools Picture Dictionary*: Developed to provide students with moderate retardation with a symbol set they could understand with little or no instruction. Current users include children and adults of all disability types. It is not appropriate for some children with low vision or individuals who can manipulate abstract concepts, symbols, and syntax. Five hundred symbols (three sizes) can be selected to address the needs of the target population.

- *Other sets* that are available include Compic, Imaginart symbols, Talking Pictures, PIC, and more.

Logical, meaning-based depiction of meaning

- *Picsyms*: Developed as a dynamic therapy tool for preschool children. It teaches adults to draw symbols so they can be created at the time they are needed. This system has a grammar. It is not appropriate for people with low vision. A dictionary of 800 symbols is available in a range of categories.
- *Blissymbols*: Pictographic, ideographic system composed of meaning-based units and some arbitrary shapes. It has a grammar and is used by children who show an interest in classifying and communicating. Simplicity of shape and line allows for writing. Vocabulary of 3,000 symbols is updated regularly by Blissymbolics Communication International. They also provide training. Materials include Blissymbols for Use and Supplements and an enhanced version for preschool children (Picture Your Bliss). Also, texts, writing, and self-study materials are available. They also offer quick access to 2,500 Blissymbols (Access Bliss) and early independent reading experiences (Story Bliss) on the Macintosh written in Hypercard.

ACTION PLAN

5/14/92

A's Team (*present at meeting)		
Name	**Role**	**Phone #**
Peggy *	Rehab eng.	
Judith & Cy *	Parents	
Sarah	Facilitator	
Glenn*	OH Teacher	
Shari*	OT	
Dana*	Teacher	
Mary*	SLP	
Kathy*	Supervisor	
Lois*	SLP	
Jennifer*	Inst. Asst.	
Hildred*	PT	

A'S NEEDS

Identified 9/90 and accomplished:
Supportive positioning/interface for function
Efficient light tech communication
Use Light Talker (32 location & 128 location)
Plan for maximal participation in classroom activities
Academic and social achievement in school
Increase direct communication with teacher and peers
Decrease dependence on aide as interpreter

Identified 9/91:
Train peers
Troubleshoot equipment
Ask questions in class
Learn to "send adults" away when not needed
Select AC repair strategies

Summary of objectives achieved: *1) Alternate access strategies for computer (cable with AFC and single switch) available but not needed. 2) Light tech alphabet overlay being used and working well. 3) A's functioning at grade level except in math.*

Issues raised: *Summer program transition to next class/new school, specifications for new communication device.*

	PLAN	*WHO*	*WHEN*	*HOW MEASURE*	*STATUS*
GOAL I:	**Maintain supportive positioning and interface for function - Shari**				
Obj. # 1:	Solve positioning problems as occur	A, Shari	Ongoing	Call Shari	No problems
Obj. # 2:	Monitor positioning of all equipment	Shari w/ACT	Ongoing	Report progress	No problems reported
Obj. # 3:	Monitor use of quick troubleshooting checklist & update as needed	Shari, Lois	Ongoing	Report on implementation	Done and working well
*Obj. #4:	Evaluate use of laser pointer w/low tech materials	A, Peggy, Shari, Glenn	6/4	Report	Smaller beam, for reading books, no wires
*Obj. #5:	Practice directed scanning w/maze overlays on LT	A, Shari, Jennifer	6/4	Report results	Mostly at home now. Motivation in practice w/LT not high/ can hit "storage" key
*Obj. #6:	Evaluate use of visor as mount for laser	Shari, Peggy, Jennifer	6/4	Report	Visor is working for now w/ current light

	PLAN	WHO	WHEN	HOW MEASURE	STATUS
GOAL II: Increase independent access to language in all contexts - Mary/Lois					
Obj. # 1:	Monitor use of facilitator strategies giving choices/ waiting, etc.	Lois	Ongoing	Observation of staff & peers	Thurs art class good time for this A can direct peers in completing projects w/coaching from Jennifer
Obj. # 2:	Systematically update LT	Judith	Ongoing	Document progress	All in black book
Obj. # 3:	Reinforce signals for expressing "no" I don't know; yes w/no tech	Lois, Hildred, Judith	Ongoing	Report use	Still working on this/A raises shoulders when told to
Obj. # 4:	Develop plan for conversational repair strategies & observe social interaction	Jennifer, Judith	6/4	Report	Implement at home
*Obj. # 5:	Use device specs to select spec. equipment/software	Peggy, Judith, Mary, A	6/4	Report results and place order	Peggy made list of specs to work from
GOAL III: Support active and independent participation in curriculum - Glenn					
Obj. # 1:	Monitor communication between Dana & adult helping A w/homework	Family, Dana	ASAP	Report effects	Link between home and school via Jennifer going well
Obj. # 2:	Increase A's initiative to indicate problems by using her voice to get attention/ need to use troubleshooting card	Jennifer, A	Ongoing	Report progress	Is going well, A sometimes needs reminders
Obj. # 3:	Conduct ongoing curriculum-based assessment w/ Dana's guidance & report findings	Jennifer, Glenn, Dana	5/30	Report	A doing well w/fractions, division, multiplication. Glenn is getting info on this. A gets processes, resists computation aspect
Obj. # 4:	Implement tutoring program in math	Glenn	Ongoing	Report plan	At school 2X per week. Jen. tutoring - Tuesdays

	PLAN	WHO	WHEN	HOW MEASURE	STATUS
GOAL IV: Develop independent mobility - Shari					
Obj. # 1:	Increase forward speed, sustain contact on switch, continue safety training in all contexts	Shari, A	ASAP	Report	Bus problem solved
Obj. # 2:	Increase opportunities to be independent with electric wheelchair	ACT	Ongoing	Report	Concern that A is being pushed more often than necessary

Appendix E Interaction Profile

General Description

The Interaction Profile, pages 61-64, provides a clinically manageable framework for systematically observing and assessing the quantitative and qualitative conversational behaviors of the child and partner in two videotaped conversational situations. The profile focuses on the importance of child behavior, the communication system, and conversational contexts. In addition, the profile attends to the reciprocal and sequential aspects of conversational exchange. The specific function, mode, and discourse behaviors assessed are outlined in the Priority Communication Behaviors (Chapter 2, Table 2-1). Current literature and clinical experience suggest that these specific behaviors are among those most critical to the interactions of augmented children and their partners. The profile provides definitions and examples for each function, mode, and discourse behavior. The primary goal of the profile is to provide critical behavior information that will assist the clinician in adapting corresponding goals and activities from the Intervention Guidelines to facilitate the conversational interaction skills of a particular dyad.

Use of videotaped samples is optimal for reliable assessment. However, video equipment is not available in all clinical settings. In such settings, clinical observation of the Priority Communication Behaviors in child-partner interactions in the natural environment may be adequate for development of a PACT intervention plan.

Administration

Qualifications of the Examiner: The examiner should be a clinician, most typically a speech-language pathologist or special educator, with extensive knowledge of pragmatics, at least basic knowledge of augmentative communication, thorough knowledge of the six chapters of this book, and competence in videotaping procedures. Before using the profile, the clinician should practice the analysis procedure on a taped augmented interaction.

Preparation: Prior to administering the Interaction Profile, the clinician has become generally familiar with the child's abilities, daily activities, interactive skills, and communication needs. Based on information gleaned from this preparation, the clinician chooses an appropriate partner and two communication contexts for the assessment.

Partner: In choosing a partner, the clinician considers partner availability for assessment and subsequent intervention. Other factors for consideration include the child's motivation to interact with the partner, the partner's interest in the child's communication skills, frequency of opportunity for child-partner interaction in daily life, and potential longevity of the child-partner relationship. In the PACT Pilot Study, parents were selected as partners because the child-parent motivation to improve communication, the communication opportunity, and the relationship longevity are frequently good. Other possible partners include teachers, teacher aides, siblings, grandparents, peers, and baby-sitters.

Contexts: The Interaction Profile suggests videotaping two different contexts. The best contexts are those that can be repeated following an intervention. Ideally, videotaping is done surreptitiously in the natural environment. However, videotaping without the knowledge or consent of the child and partner poses logistical and ethical problems. Access to the natural environment is often difficult and, even when feasible, may present technical problems. Therefore, conversational contexts for videotaping in the clinical setting should be carefully chosen and defined for the particular dyad. It may be helpful to choose a high-frequency, minimally complex interaction, such as making a snack or playing with toys, and a more difficult interaction, such as solving a problem or relating a remote event. Many times the child and partner can provide suggestions for communication contexts. If only one context is evaluated, the clinician must be sure that performance in that context represents the dyad's typical communication interactions.

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Time: An estimated time for data collection and analysis with two contexts is three hours—one hour to videotape (two 20-minute contexts) and two hours for analysis. The time frame for analysis will vary somewhat depending on factors such as the child's message frequency, rate, and intelligibility.

Videotaping: Videotaping allows clinicians to observe the multiple characteristics and behaviors of an interaction on repeated viewings. In settings where video equipment is not available, the clinician may wonder about the potential of the Interaction Profile for on-line observation. The profile's potential for this type of observation has not been studied. However, it is suspected that reliable on-line coding of all function, mode, and discourse behaviors is not possible. Clinicians are urged to purchase high-grade videotape to provide a quality recording. Equipment with automatic focus, zoom lens, pause, slow motion, and time generator features is helpful. Before taping, the equipment should be tested. In some cases, especially if the child produces distorted or low-volume speech, it may be necessary to use a supplementary microphone rather than the boom microphone on the camera. Clinicians must also attend to taping the child, partner, and augmentative techniques simultaneously.

In recording the two conversational contexts, the equipment should be as unobtrusive as possible. The child and partner should be instructed to interact as normally as possible. The clinician should provide approximately three minutes of lead time before timing the interaction. If the two contexts are recorded continuously in the same physical setting, lead time is needed only at the beginning of the first context. Lead time allows the dyad to settle into the situation and to adjust to the equipment. After the lead time has expired, the clinician records for 20 minutes.

Videoanalysis/Scoring

Before reviewing and analyzing the videotape, the clinician must be thoroughly familiar with the definitions of Communication Modes, pages 33-34, Message Effects, pages 33-34; Child Behaviors, pages 34-36; Partner Behaviors, pages 36-37; Performance Codes, page 37.

Definitions

COMMUNICATION MODES (page 3 of the profile)

Eye Gaze—Use of visual focus or eye contact for communication interaction. (Examples: looks at sink to indicate desire for water; makes eye contact with partner to secure attention.)

Facial Expressions—Use of conventional or idiosyncratic facial movements. (Examples: smiling, pouting, raising eyebrows to question, closing eyes to indicate a desire to lie down.)

Gestures—Use of conventional or idiosyncratic movements of the head or extremities. (Examples: yes/no head nods, pointing, reaching out, waving, patting self on head to indicate grandfather who always wears a hat.)

Vocalization—Use of voice that is not intelligible to the listener and not consistent to a specific referent. (Examples: uses voice to indicate pleasure or uses voice to secure partner's attention.)

Speech—Use of natural speech (obvious words or word approximations) that has a consistent referent and is generally intelligible to the listener.

Augmentative Communication Technique(s)—Use of a specialized communication mode that should be described in terms of the following:

1. Symbol system (Examples: sign language, pictures, rebus symbols, alphabet, words)
2. Transmission technique (Examples: direct selection—hand pointing; scanning—eyebrow switch)
3. Output (Examples: short-term visual, voice synthesizer, printer, etc.)
4. Other: Use of a mode not previously defined should be carefully described.

MESSAGE EFFECTS (page 2 of the profile)

Successful Message—A message is successful when, having observed the sequence of the interaction, you judge that the partner understood the child's intended message.

Unsuccessful Message—A message is unsuccessful when, having observed the sequence of the interaction, you judge that the partner did not understand or acknowledge the child's intended message.

Ambiguous Message—A message is ambiguous when, having observed the sequence of the interac-

tion, you judge that (a) the partner's response to the child's message fails to clearly indicate understanding or non-understanding of the child's apparent intent, or (b) the child's response to the partner's response to the child's message fails to indicate that the partner has or has not understood the message as intended.

Example:

Partner:	"So, what shall we do next?"
Child:	(Ambiguous vocalization plus ambiguous gesture to art supplies on the table.)
Partner:	"Okay. We'll just paint your face."
Child:	(Does not respond)

The child's message is ambiguous because the partner did not make it clear that she understood it. In addition, the child did not indicate that his message was understood or not understood.

CHILD BEHAVIORS (page 3 of the profile)

Functions	
Socializes	Child uses greetings, courtesies, and social comments. *Examples:* A. Child sees a friend and indicates, "Hi, how are you?" B. Child accidentally bumps someone and indicates, "I'm sorry." C. Child requests a drink using "Please" and indicates "Thank you" when receiving it.
Answers Yes/No Questions	Child produces a *Yes* or *No* response to questions requiring an affirmative or negative response. *Examples:* A. Partner asks, "Do you want a drink?" Child answers *yes* by nodding head, looking up, or saying "Yeah." B. Partner asks, "Is Bobby back from vacation?" Child answers *no* by shaking head or saying, "No."
Answers other questions	Child produces responses to questions that cannot be answered with *yes* or *no*. *Examples:* A. Partner asks, "What did you have for lunch today?" Child answers, "Pizza." B. Partner asks, "Where is your homework?" Child answers, "At home." C. Partner asks, "How did you do on your spelling test?" Child answers, "100."
Offers information	Child provides information that is not solicited by a question or a prompt. *Examples:* A. Child comes home from school and indicates spontaneously, "I finished reading my book." B. Partner says, "I went to McDonald's last night." Child indicates, "I had yucky meatloaf."
Requests assistance, an object, or an action	Child indicates a desire for help, a thing, or an activity. *Examples:* A. Child indicates, "I want to go to bathroom." B. Child indicates, "I need new crayons." C. Child indicates, "Push me."
Requests information	Child indicates a desire for knowledge of partner. *Examples:* A. Child indicates, "Where is Daddy?" B. Child indicates, "Is Bobby sick?" C. Child indicates, "Tell me about your trip."
Expresses feelings and attitudes	Child indicates own emotions, physical states, and beliefs. *Examples:* A. Child indicates, "I'm mad at Mommy." B. Child indicates, "I'm hungry." C. Child indicates, "I don't like tomatoes."
Teases and/or pretends	Child makes jokes, plays imaginary roles, or communicates about imaginary friends or places. *Examples:* A. Child teases partner indicating, "You're lazy." B. Child plays house and indicates in the role of the parent, "No, no. Now you have to sit in the corner." C. Child tells about an imaginary friend, "My friend Bacco has green hair."
Other pertinent functions	The list of functions is not all-inclusive. It represents the authors' biases regarding functions that most frequently contribute to the effectiveness of communication interactions involving augmentative techniques. However, for any particular dyad, other functions may be equally important to note. For example, when a child frequently labels objects, imitates partner utterances, or rejects partner utterances that could have a substantial impact on interaction, such functions should be noted and described.

Mode	
Demonstrates strategies for mode use according to partner/situation	The child chooses an effective mode of communication (eye gaze versus speech versus communication board) relative to partner and situation. *Examples:* A. The child uses speech to communicate with Mom because she will understand, but uses a communication board to communicate the same information to a stranger who might find the speech unintelligible. B. The child uses an augmentative technique to establish a topic that Mom might not be able to anticipate. Then, the child begins to use speech. C. The child uses speech or vocalization with gestures to communicate because the partner is too far away to see what the child is pointing to on the communication board.

Discourse	
Responds to partner's communication	The child in some way acknowledges the partner's communication. *Examples:* A. The partner comments on the weather. The child responds by looking up, smiling, nodding agreement or disagreement, shrugging shoulders, or commenting about the weather forecast, rather than not responding. B. The partner asks a question that the child does not comprehend. The child shrugs shoulders or indicates "I don't know" or "I don't understand" rather than not responding. C. The partner instructs the child to do something. The child performs the task or indicates "I can't" or "I don't want to" rather than not responding.
Secures partner's attention	The child exhibits a behavior, judged by the observer to be intentional, that gains the attention of the communication partner. *Examples:* A. The partner is reading near the child. The partner looks up and the child intentionally makes eye contact as if to say "Let's talk." B. The partner's back is turned to the child. The child bangs on tray, vocalizes, or calls partner's name. The partner turns to the child.

Discourse	
Establishes topic	The child introduces a new idea or content area into the conversation. *Examples:* A. The child gains a partner's attention and makes a comment or asks a question. B. Following a pause in an established conversation, the child tells about plans for the next day, or feelings about a friend. C. The partner talks about a picture of an elephant. The child begins to talk about a school field-trip to the zoo.
Sustains topic	The child continues to embellish a conversational content area (self- or partner-established) for three or more consecutive child messages. *Examples:* A. The partner comments on the sunny weather. The child indicates that the cool wind feels good. The partner agrees. The child indicates a desire for continued good weather for an evening picnic. The partner agrees. The child asks about the weather forecast. B. The child tells about getting in trouble at school. The partner expresses disapproval. The child indicates someone else was at fault. The partner asks about punishment. The child indicates going to the principal's office.
Recognizes nonverbal feedback from partner about comprehension	The child identifies nonverbal communication from partner regarding the partner's understanding or lack of understanding of a message. *Examples:* A. The child produces a message, recognizes the partner's nod of comprehension, and completes the message. B. The child produces a message and recognizes that the partner looks confused.
Provides feedback to partner	The child indicates (1) understanding or lack of understanding of partner's message, (2) accuracy or inaccuracy of the child's message, and (3) the partner's accuracy or inaccuracy in interpreting the message. *Examples:* A. The partner produces a message. The child nods head to indicate understanding or has a puzzled facial expression to indicate lack of understanding. B. The child produces a message then looks to the partner for response, if message is accurate, or says "Uh oh" at discovery that an incorrect symbol was indicated.

Discourse

C. The child points to symbols on the communication board to formulate a message. The partner says each word aloud as the child points. The child keeps going or nods as the partner says the correct word, but stops and says "Uh uh" if the word is wrong.

Repairs communication breakdown When a message produced by the child or the partner is not understood or is not accurate, the child salvages the interaction by repeating it, revising it, asking a question about it, giving a hint, etc.

Examples:

A. The partner asks the child to find the *wrench*. The child doesn't know what a *wrench* is and asks, "What's that?"

B. The child produces a message and points to the wrong symbol. The child indicates the mistake and starts over.

C. The child produces a message about a *baby*. The partner assumes the child is talking about a baby sister. The child indicates, "No, my teacher's baby."

PARTNER BEHAVIORS (page 4 of the profile)

Functions

Varies communication functions Partner uses communication for a variety of purposes including socializing, offering information, expressing feelings or attitudes, and teasing or pretending. (See Definitions of Child Target Behaviors, page 34, to specify these purposes.

Mode

Models use of augmentative communication technique(s) The partner uses the child's specialized communication approach(es) to demonstrate how the child could say something, to expand upon what the child has said, or to communicate the partner's own message.

Examples:

A. The child wants to tell a third person about being in the school play, but doesn't know how. The partner knows the child's intent and points to symbols on the communication board for "I was in school play (verb)" and says the sentence aloud.

Mode

B. The child indicates on the communication board, "I ice cream." Partner points to the symbols on the communication board for "I want ice cream," and says the sentence aloud.

C. After returning from shopping, the partner signs to the child, "I saw your teacher at the store," and says the sentence aloud.

Discourse

Positions self appropriately The partner situates self in relation to the child for adequate access to the child's communication techniques.

Examples:

A. The child has some intelligible speech but cannot project loudly across the room. The partner sits near the child to hear.

B. The child uses a manual communication board. The partner moves close to the child to see the symbols the child points to.

C. The child uses sign language. The partner makes sure the child is easily within vision.

Provides pause time The partner will be silent for at least four seconds after producing an utterance.

Examples:

A. The partner says, "I had a good day today," and pauses for at least four seconds before saying anything else.

B. The partner says, "Tell me about the party," and pauses for at least four seconds before saying anything else.

Modifies questions Partner revises *yes/no* and short-answer questions to statements, comments, or open-ended questions that provide opportunity for more complex child messages. (Exceptions may be made for questions that confirm or clarify the child's topic.)

Examples:

A. The partner converses with the child about the school day. The partner says, "I had a busy day at work today," or "Tell me about your day" (instead of "How was your day?" or "What did you do at school?").

B. It's late morning. The child vocalizes displeasure. The partner says, "I'm getting hungry" (instead of, "Are you hungry?").

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Discourse	
	C. The partner and child are deciding on a field trip. The partner says, "I wonder what kind of trip would be fun," or "There must be lots of places you'd like" (instead of "Do you want to go to the zoo?" or "How about the aquarium?") An exception would be if the child points on the communication board, but the pointing is not precise. The partner, unsure which symbol the child is indicating asks, "Are you pointing to *hot dog*?"
Reinforces child messages	The partner will respond to or acknowledge the child's attempts to communicate. *Examples:* A. The child vocalizes to the partner from across the room. The partner is busy, but acknowledges the child's attempt to communicate, "I hear you, but I have to finish writing this down. I'll be there in a minute." B. The child points on the communication board to "I eat pizza." The partner responds, "Lucky you. I had tuna salad for lunch." C. The child angrily vocalizes, "I don't want to" regarding completing a school assignment. The partner says, "I know you don't want to and I know you're mad, but we have to keep up with your schoolwork."
Confirms child messages	The partner verbally clarifies the messages established by the child before continuing the conversation. *Examples:* A. The child points to a symbol on the communication board. The partner says, "Bobby." The child continues to the next symbol. The partner says, "is." The child points to another symbol and looks up to indicate that the message is completed. The partner says, "sick . . . Bobby is sick." The child nods, "Yes." B. The child points on the communication board to "Red car, no hat." The partner clarifies, "Are you talking about your teacher's red convertible?" The child indicates, "Yes." C. The child produces a message on the voice synthesizer. The partner did not understand and says, "I couldn't tell if that was *tea* or *key*." The child spells "T-E-A."

Discourse	
Elaborates child messages	The partner follows the child's lead in choosing ideas or content areas for conversation by offering further information or related events, expressing feelings or attitudes, etc., regarding the child's selected topic. *Examples:* A. The child indicates, "We saw a movie at school." The partner says, "That sounds like fun." The child indicates, "Yeah. It was Pinocchio." The partner says, "There are some good parts in that one." The child indicates, "Boy's nose gets big, big, big." B. The child indicates, "I saw a monster." The partner says, "I bet it was big." The child indicates, "It was big and blue." The partner says, "Sounds scary to me." The child indicates, "No, it was Cookie Monster."

PERFORMANCE CODES

A Demonstrates the behavior with general accuracy and frequency, taking advantage of the greatest number of opportunities for producing the behavior.

B Demonstrates more than two accurate productions of behavior, but unsuccessful productions or missed opportunities for production are frequent.

C Demonstrates one or two accurate productions of behavior, but unsuccessful productions or missed opportunities for production are frequent.

D Demonstrates behavior, but production is consistently unsuccessful or fails to demonstrate behavior when opportunity is present.

NO No Opportunity. Does not demonstrate behavior, but opportunity was absent.

USING THE PROFILE—STEP BY STEP

When familiar with the necessary definitions, the clinician is ready to begin the following procedure: Refer to the Sample Interaction Profile on the following pages. A blank copy of the profile begins on page 61.

TABLE 3-2

PACT Interaction Profile Summary Sheet

(See administration instructions on page 32.)

STEP 1 **Identifying Information**

Names of Child/Partner: John / Mom

Child's Date of Birth: 2/20/73 Date of Recording: 7/10/86

Clinician: OC / MC

STEP 3 **Communication Contexts**

Context 1 Snack

Start # 220 Corresponding Message: "We have to stir this 'til it thickens up."

Stop # 930 Corresponding Message: "Movie ... make a movie out of you."

Context 2 Craft (make up; masks)

Start # 1435 Corresponding Message: "... look like candy ... ice cream sticks."

Stop # 1931 Corresponding Message: "Okie, dokie"

STEP 11 **Quantitative Observations** (compiled from both contexts)

Time: Total time for Context 1 8 min, 20 sec Total time for Context 2 9 min, 5 sec

Frequency: 50 / 250 child messages/total messages (partner + child)

Intelligibility: 38 / 50 successful child messages/total child messages

Predominant Child Functions: Answers Y/N ?'s* Answers Other ?'s

Requests Information Offers Information

Comments: * 7 were ambiguous

STEP 12 **Qualitative Observations**

Observations About the Child's Communication System: Try use of chimpinator; adapt easel so John can see to drive wheelchair

Mode and Discourse Observations: John used his comm. board only twice during coded interactions; he perseverated on "going home." John relied primarily on residual speech.

STEP 13 **Summary Observations**

Interaction Characteristics: Mom dominates interaction with lots of questions. Ambiguous vocalizations sometimes ignored. John maintains focus well but needs to improve eye contact.

Child Behaviors

Strengths: Some limited topic establishment; some evidence of strategies for mode use; attends well to partner

Needs: Increase strategies for mode use; establish topics; answer other questions (without ambiguity)

Partner Behaviors

Strengths: Reinforces child messages; elaborates messages; varies functions; praises self appropriately

Needs: Model use of John's communication board; simplify questions (esp. Y/N ?'s); increase pause time

STEP 14

Additional Comments: Reinforce eye contact from John (to facilitate feedback to partner)

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TABLE 3-2

Transcription Sheet — Child Messages

STEP 4

Context 1

Transcription of Child Messages	Mode*	Function**	Effect***
1. Ambiguous vocalization	V	O	O
2. "Mom... Dad."	S	RAOA	S
3. "Spoon"	S	RAOA	S
4. Nod "Yes"	G	AYN	S
5. "Yeah"	S	AYN	S
6. "Yeah"	S	AYN	S
7. Ambiguous vocalization	S	O	Ø
8. Ambiguous vocalization	S	O	Ø
9. "What doing in there?"	S	RI	S
10. "How?"	S	RI	S
11. Ambiguous vocalization	S	AOQ	O
12. "Home."	S	OI	S
13. "Me"	S	AOQ	S
14. "TV"	AT	AOQ	S
15. "Nod "Yeah"	G	AYN	S
16. "Yeah"	S	AYN	S
17. "Yeah"	S	AYN	S
18. Nod "Yeah"	G	AYN	S
19. "What?"	S	RI	S
20. "Home"	S	OI	S
21. "Me"	S	AOQ	S
22. Ambiguous vocalization	V	AOQ	O
23. "Yeah" (confirmation)	S	O	S
24. Ambiguous vocalization	V	AOQ	O
25. "Movie"	S	OI	S

Context 2

1. Ambiguous vocalization	S	AYN	O
2. Ambiguous vocalization	V	AOQ	Ø
3. "Yellow"	AT	AOQ	S
4. "Yeah" (nod)	G	AYN	S
5. "Why?"	S	RI	S
6. "He-man"	S	OI	S
7. "Yeah" (nod) (confirmation)	G	O	S
8. "No" (nod)	G	AYN	S
9. Ambiguous vocalization	V	AOQ	O
10. "Uh huh"	V	AYN	S
11. "Yeah" (nod)	G	AYN	S
12. "Yeah" (nod)	G	AYN	S
13. "Yeah" (nod)	G	AYN	S
14. Ambiguous vocalization	V	O	O
15. "Excuse me"	S	S	S
16. "Home"	S	RI	S
17. "You"	S	RAOA	S
18. "Yeah" (nod)	G	AYN	S
19. "He-man"	S	AOQ	S
20. Ambiguous vocalization	S	AOQ	O
21. "Orange"	S	AOQ	O
22. Ambiguous vocalization + puts felt on plate	V+G	AOQ	O
23. "No" (nod)	G	AYN	S
24. "Make mouth"	S	AOQ	S
25. "Yeah" (confirmation)	G	O	S

*Modes:
AT = Aug Tech
E = Eye Gaze
F = Facial Exp
G = Gest
V = Vocalize
S = Speech
Sg = Sign

**Functions:
S = Socializes
AYN = Answers Y/N Questions
AOQ = Answers Other Questions
OI = Offers Information
RAOA = Requests Assistance/Object/Action
RI = Requests Information
EFA = Expresses Feelings/Attitudes
TP = Teases/Pretends
O = Other

***Effect:
S = Successful
/ = Unsuccessful
0 = Ambiguous

TABLE 3-2 (continued)

Child Behaviors

Quantitative Observations

Communicative Messages
Number 1-25; put a slash through unsuccessful messages (2); circle ambiguous messages (②)

Function	Context 1	Context 2	Totals for Each Context 1	Totals for Each Context 2
Socializes (S)		15	0	1
Answers yes/no questions (AYN)	4, 5, 6, 15, 16, 17, 18	①, 4, 5, 10, 11, 12, 13, 18, 23	7	9
Answers other questions (AOQ)	⑪, 13, 14, 21, ㉒, ㉔	②, 3, ⑨, 19, ⑳, 21, ㉒, 24	6	8
Offers information (OI)	12, 20, 25	6	3	1
Request assistance/ object/action (RAOA)	2, 3	17	2	1
Requests information (RI)	9, 10, 19	5, 16	3	2
Expresses feelings and attitudes (EFA)			0	0
Teases/pretends (TP)			0	0
Other (O)	①②③ 23	7, ⑭, 25	4	
		Context Totals:	25	25

STEP 6

Total Number of Child Messages: 50

Intelligibility Ratio
(Successful child messages/total child messages): 19 / 25 | 19 / 25

Qualitative Observations

[Performance Codes: A, B, C, D, N.O. (No opportunity)]

STEP 7

Mode: (circle those noted) Eye Gaze Facial Expression (Gesture) (Speech)

Sign (Vocalization) (Augmentative Technique(s)) Comm board / Rebus symbols

Comments: Used board x 2 (Mom prompted once)

	Perf. Code Rating Context 1	Perf. Code Rating Context 2
Mode Demonstrates strategies for mode use according to partner/situation	C	D
Discourse Responds to partner's communication	B	B
Secures partner's attention	A*	A*
Establishes topic	B**	C
Sustains topic	D	D
Recognizes feedback from partner	C	C
Provides feedback to partner	C	C
Repairs communication breakdown	D	D

* Mom always gave full attention
** Perseverated on going home

TABLE 3-2 (continued)

Partner Behaviors

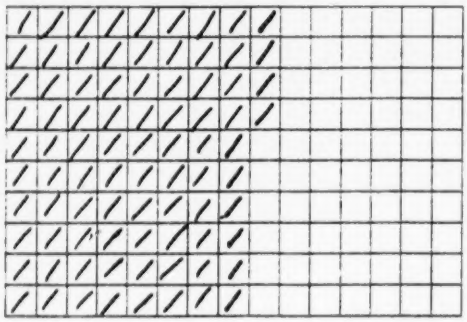
STEP 8

Quantitative Observations

Communicative Messages

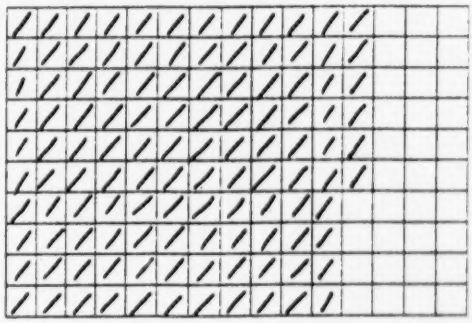
Place a slash (/) in the grid for each communication message produced. Do not count requests for clarification.

Context 1



Total: 84

Context 2



Total: 116

Total Partner Messages for Both Contexts: 200

STEP 9

Qualitative Observations

[Performance Codes: A, B, C, D, N.O. (No Opportunity)]

	Context 1	Context 2
Functions Varies functions (socializes, answers yes/no questions, answers other questions, offers information, requests assistance/object/action, requests information, expresses feelings/attitudes, teases/pretends, other)	A	A
Mode Models use of augmentative technique(s)	D	C
Discourse Positions self appropriately	A	A
Provides pause time	C*	C*
Modifies questions	C	D
Reinforces child messages	B	A
Confirms child messages	B	A
Elaborates child messages	A	A

Comments: * Not used as a strategy

Step 1—Review the Interaction Profile form and complete the Identifying Information section on the Summary Sheet (page 61).

Step 2—Reset the video-counter to "0000," start the recorder, time the 3-minute lead time, and stop the tape. (This step may be omitted if a time generator is used.

Step 3—The clinician notes on page 1 of the profile the start number on the video-counter and the partner message that directly precedes the first child message to be transcribed.

A communicative message is defined as a spontaneously formulated, completed unit that clearly attempts to contribute meaning to the conversation. A message must have at least one clear lexical referent.

A communicative message excludes physical signals without specific verbal referents as well as exchanges to formulate a message or to repair communication breakdown.

Examples of a variety of communicative messages are given in Table 3.3.

TABLE 3.3

Example 1

Partner: "What do you want for lunch?"
Child: Points to symbol for *I*
Partner: (Confirms) "I."
Child: Points to symbol for *want.*
Partner: (Confirms) "Want."
Child: Points to symbol for *hamburger.*
Partner: "Okay." (Confirms) "Hamburger."

The following two communicative messages were produced by the partner:
"What do you want for lunch?"
"Okay."

The following communicative message was stated by the child:
"I want hamburger."

Example 2

Child: "School fun."
Partner: "Really?"
Child: "Mrs. Kraft. Computer. Me."
Partner: "Mrs. Kraft let you use the computer?"
Child: "Uh huh."
Child: "New game."
Partner: "Well, I can see how you had fun at school today—you played a new game on the computer."

The following two communicative messages were stated by the partner:
"Really?"
"Well, I can see how you had fun . . ."

The following three communicative messages were produced by the child:
"School fun."
"Mrs. Kraft. Computer. Me."
"New Game."

Example 3

Partner: "Do you want a bun?"
Child: "Uh, huh."
Partner: "How 'bout ketchup?"
Child: "Uh, huh."
Child: Points to **C.**
Partner: "C."
Child: Points to **H.**
Partner: "H."
Child: Points to **I.**
Partner: (Guesses) "Chips?"
Child: "Uh, huh."

The following two communicative messages were stated by the partner:
"Do you want a bun?"
"How 'bout ketchup?"

The following three communicative messages were produced by the child:
"Uh, huh."
"Uh, huh."
"Chips."

Example 4

Child: Points to **I.**
Partner: *"I."*
Child: Points to *want.*
Partner: "Want."
Child: "Uh, huh."
Child: Points to *have.*
Partner: "Okay, I have."
Child: Points quickly to *new shoes.*
Partner: "I have new shoes."

No communicative messages were stated by the partner.

One communicative message was stated by the child:
"I have new shoes."

Example 5

Child: Puts index finger in mouth.
Partner: "Oh, you need a straw."
"I got the bendable straws this time."
Child: Smiles and vocalizes. No specific lexical referent identified.

The following communicative message was indicated by the partner:
"I got the bendable straws this time."

The following communicative message was stated by the child:
"Straw."

Step 4—To transcribe the child communicative messages on the Transcription Sheet (page 2 of the profile), start the videotape and write down the child's first message. Based on the Interaction Profile definitions, note on page 2 the function (page 34), effect (pages 33-34), and mode(s) (page 35). This notation requires careful attention to the child and partner behaviors. The possibility of making notations continuously will vary depending on your experience as well as the complexity and rate of the messages. Some messages may require a second or third viewing. Even during continuous notation, stop and rewind the tape after every three messages to review and check notations. Continue with this procedure until 25 consecutive child messages have been transcribed or until the entire 20-minute tape has been viewed. On page 1 of the profile, record the stop number on the video-counter and the corresponding message.

Step 5—To transfer information on page 2 to the grid at the top of page 3 of the profile, write the number of the message in the grid next to the type of function that message serves.

Example: (taken from page 2 of the sample profile)

John
Message 1: Ambiguous vocalization
Message 2: "Mom . . . hand"
Message 3: "Spoon"
Message 4: (Nods) "Yes"

In this example, John's first message was ambiguous and the intended function was unknown, so the number **1** is recorded and circled in the box next to Other. The second message was a request for object/assistance, so the number **2** is recorded in the box next to Requests Assistance/Object/Action. The third message is again a request for an object, so the number **3** is recorded in Requests Assistance/Object/Action. The fourth message answers a yes/no question, so the number **4** is recorded in Answers Yes/No Questions.

If the intended *function* of a message is unclear, the message should be noted and circled under Other.

If the intended function of a message cannot be appropriately included in one of the functions provided, that message should also be noted under Other.

If the message is unsuccessful, place a slash through the message number.

Step 6—Total the numbers and types of child communication messages at the right side of page 3 of the profile and calculate the intelligibility ratio, which is the number of successful child messages divided by the total number of child messages (successful + unsuccessful + ambiguous) The total number of messages will frequently be 25.

Step 7—Focus next on Child Behaviors, Qualitative Observations, at the bottom of page 3 of the profile. If the first viewing of the tape was not sufficient to effectively complete the Qualitative Observations, a second viewing of the transcribed segment of the tape may be necessary.

a. On page 3 of the profile, specify (circle) the communication modes noted on page 2 of the profile.

b. Rate the child's modes and discourse skills (A, B, C, D, or No Opportunity). See Performance Code definitions on page 37.

Step 8—View the segment of the tape designated in Step 4 a second time to (1) time the segment and (2) make observations about the partner. Note the time or start a stopwatch when starting the tape at child communication message 1. Record the number of partner messages (with a dot or a slash) on the grid at the top of page 4 under Quantitative Observations. Immediately upon completion of the child's 25th message, note the time or stop the stopwatch and record the total time on page 1 of the profile (Summary Sheet).

Total the number of partner communication messages.

Step 9—Focus on the Partner Qualitative Observations section of page 4. Rate the partner's communication skills (A, B, C, D, or No Opportunity). See Performance Code definitions on page 37.

Step 10—Repeat Steps 2-9 for the second communication context. If the two video contexts are recorded consecutively, it is not necessary to exclude the first 3 minutes of the second context.

Step 11—Complete the Quantitative Observations section on page 1, based on *both* communicative contexts.

Time—Time is the total number of minutes/seconds for each of the 25 consecutive message contexts. When 25 consecutive messages are not produced, the time for that context will be 20 minutes.

Frequency—This is the total number of child messages for both contexts divided by the total number of messages of the partner and child together.

Intelligibility—This is the number of successful child messages divided by the total number of child messages.

Predominant Child Functions—List the three or four most frequently occurring child functions as determined from the totals of both contexts. A comments line is provided for noting pertinent information; for example: Were all instances of a particular function ambiguous? Were behaviors appropriate?

Step 12—Complete the Qualitative Observations section on page 1 of the profile, based on both communicative contexts.

Observations About the Child's Communication System—Make observations about the child's communication system as a whole, paying particular attention to dimensions of augmentative technique(s) and user strategies.

Here are several questions to consider:

1. Does at least one of the modes offer an attention-getting signal and quick, reliable yes/no response?
2. Does the combination of modes provide access to enough vocabulary to answer other questions, offer information, express feelings, sustain the topic, etc.?
3. Are transmission techniques as fast and efficient as possible?
4. Which available modes noted are most intelligible to the partner? Are some unintelligible?
5. Does the system provide access to helpful cues ("It's not on my board," or "The first letter is _____") or signals ("That was a mistake so I'll start over," or "Guess").

Mode and Discourse Observations—The clinician summarizes the child/partner mode and discourse ratings.

Step 13—Complete page 1 of the profile based on both communicative contexts.

Interaction Characteristics—Note general interaction characteristics such as active/passive roles, participant enjoyment or frustration, and general communicative complexity.

Strengths and Needs (of Partner and Child)—Note the strengths and needs of each partner based on the function, mode, and discourse behaviors of both participants. If you wish to discuss the profile observations, encourage the child and partner to relate the observations to their daily communication experiences. Together, based on the needs noted and child/partner feedback, the clinician, child, and partner agree upon appropriate goals for communication intervention. Suggestions for interpretation and goal selection are provided later in this chapter.

Step 14—Make any necessary additional comments, such as identifying prerequisite skills that may need to be addressed before attending to a specific behavior or commenting on other behaviors that may need to be indirectly addressed in therapy.

Reliability

Reliability has consistently been a difficult issue in coding the communication interactions of normal and disordered dyads. A reliability study was conducted in conjunction with the PACT Pilot Project. This study indicated that trained practiced observers were capable of correlation coefficients of $\geq .87$ for all behaviors assessed for repeated observations. For more information, see Chapter 6.

Clinicians beginning to use the profile should do at least one spot (one context or 25 child-communicative messages) intra-observer reliability check to be sure of their skills. Where possible, sitting down and talking through a videotape with another clinician may be productive.

Interpretation

General Guideline—In interpreting the results of the Interaction Profile and developing an intervention plan, keep in mind the following five *assessment questions:*

1. Which behaviors need to be developed as prerequisites to other behaviors?
2. Which behaviors appear most responsive to intervention?
3. Which behaviors would have the greatest impact on the interaction?
4. Which behaviors are of greatest interest to the child and partner?
5. Which child/partner behaviors best complement each other in intervention?

The hierarchical order and of function and discourse behaviors should be kept in mind when

choosing target behaviors. Use of these guidelines can best be illustrated with a case study.

Case Study

The interactions of John and his mother are notated in the sample Interaction Profile in Table 3-2.

Summary Sheet: Identifying Information—This dyad consisted of John, a 12-year-old male child, and his mother. Two communication contexts were used for videotaping. For Context 1, John and his mother made a snack together (from several choices: popcorn, pudding, juice, chocolate milk, and crackers). Context 2 was a craft activity that consisted of creating a "new look" for one or both partners with masks or makeup.

QUANTITATIVE OBSERVATIONS

Time—Total time for obtaining 25 child messages in Context 1 was 8 minutes, 20 seconds; total time in Context 2 was 9 minutes, 5 seconds.

Frequency—John had 25 messages in each context for a total of 50 messages. His mother had 200 messages. Their combined messages totaled 250. Therefore, John's messages accounted for only one-fifth of the total messages. This figure gives the clinician some idea of how much a given interaction is dominated by one participant.

Intelligibility—Only 38 (76%) of John's total messages were successful. The others were either ambiguous or unsuccessful or both.

Predominant Child Functions—John's message functions consisted primarily of answering yes/no questions and other questions. Note that 7 of the 15 answers to other questions were ambiguous. Upon referring to John's transcription sheet (page 2 of the profile), other functions when present were generally one-word messages such as "how?" (requesting information), "spoon" (requesting assistance/object/action), and "movie" (offering information).

QUALITATIVE OBSERVATIONS

Observations About Child's Communication System—The clinician noted that John's communication-board easel needed to be adapted so that John could see to drive his new wheelchair. In addition, she recommended that John try a chinpointer in place of his headpointer to facilitate eye contact.

Mode and Discourse Observations—John used his communication board only twice in the total time of videoanalysis. He relied primarily on residual speech for communicating with his mother. His limited ability to establish a topic was complicated by the fact that he appeared to be perseverating on "going home." Some of John's ambiguous vocalizations were ignored by his mom.

SUMMARY OBSERVATIONS

Interaction Characteristics—John's mother clearly dominated the interaction with lots of questions. John had some ambiguous vocalizations that were ignored and others that his mother apparently understood. John attended well to her communication and maintained the focus of the interaction.

Child Behaviors/Strengths—John's strengths included responsiveness to his mom's communication and an emerging ability to establish a topic. His ability to answer yes/no questions and other questions was consistent although, again, many of the answers were ambiguous to the clinicians and to his mom.

Child Behaviors/Needs—Typically the Needs section addresses the most basic profile behaviors the child has difficulty with. John's needs involved developing strategies for mode use (to decrease the ambiguity of his messages), answering other questions (using an appropriate/effective mode), and establishing topics.

Partner Behaviors/Strengths—His mother's strengths included reinforcement of John's messages, elaboration of the messages (when understood), varying functions, and positioning self appropriately.

Partner Behaviors/Needs—John's mother's needs were determined to be modeling the use of John's augmentative technique, providing pause time, and modifying questions—especially yes/no questions.

After reviewing the Interaction Profile and discussing the findings with the child and the partner, the clinician develops an Intervention Plan, Table 4-7. Goals chosen for intervention should take into account the five assessment questions posited earlier in this chapter. The Intervention Plan will be further discussed in Chapter 4.

Conclusion

Upon completion of the Assessment Guidelines, the clinician has a good data base regarding child-partner communication attitudes and interaction skills to begin to plan intervention. The Assessment Guidelines can be re-administered periodically to assist the clinician in monitoring a dyad's progress in the development of conversational interaction skills.

Appendix F Communication Skills Inventory

Student: _____ Program: _____

Date: _____ Person Completing Inventory: _____

Directions: Please complete the communication inventory on the student named above. The information will be used to evaluate his or her current communication abilities. Check all that apply to the student.

1. Desire to Communicate

   A. Degree of interest the individual demonstrates in communication:

   _____ 1) enjoys communicating

   _____ 2) responds but does not initiate communication

   _____ 3) resists communicating

   _____ 4) becomes frustrated (with difficult tasks; listener's misunderstanding)

   B. The manner by which the student demonstrates interest in communication:

   _____ 1) no interest

   _____ 2) indicates a preference when given two choices

   _____ 3) indicates a preference among more than two choices

   _____ 4) responds to questions with a consistent "yes" or "no"

   _____ 5) responds to questions with other than "yes" or "no"

   _____ 6) initiates interaction/communication with others

Reprinted from: Leite J., Bortnem, P., Barry, M., Carlson, F., Hough S., & Young, C. (1988). Implementing a systematic evaluation procedure for individuals requiring augmentative aids and techniques. In S. Blackstone, E. Lucinda Cassatt-James, and D. Bruskin (Eds.), *Augmentative Communication: Implementation Strategies* (pp. 3.37 - 3-41). Rockville, MD: American Speech-Language-Hearing Association. Reprinted with permission.

C. The student's response when the meaning of his or her message is not being comprehended by the listener is:

_____ 1) not aware when message is not understood

_____ 2) aware, but uses no strategies to repair the miscommunication

_____ 3) repeats the message

_____ 4) rephrases the message

_____ 5) uses different communication mode (e.g, if speech is not understood, uses gestures)

_____ 6) environmental clues frequently clarify communicative intent

2. Present Means of Communication

A. Is the individual currently using the following:

_____ 1) socially responsive behavior

_____ 2) gestures

_____ 3) facial expressions

_____ 4) signing

_____ 5) vocalizations

_____ 6) speech

_____ 7) verbal yes/no response

_____ 8) non-verbal yes/no response

_____ 9) idiosyncratic or personalized signs

_____ 10) other (describe) _____

3. Present Level of Social Development

A. General level of alertness:

_____ 1) no interest in surroundings

_____ 2) little interest in surroundings

_____ 3) sometimes observant; sometimes sees humor in situations

_____ 4) very alert, observant; sees humor in situations

B. Level that best describes the child's social play:

_____ 1) unoccupied behavior

_____ 2) onlooker behavior

_____ 3) solitary independent play

_____ 4) parallel play

_____ 5) associative play

_____ 6) cooperative play

4. Present Communication

A. Client has means to:

_____ indicate basic wants & needs (drink, toilet)

_____ indicate feelings (happy, frustrated, fearful)

_____ indicate physical states (tired, uncomfortable)

_____ request objects & events that are present

_____ request objects & events that are not present

_____ request information

_____ indicate rejection

_____ talk about events that have occurred

_____ talk about events that have not occurred

_____ engage in social conversation (e.g., Hi! How are you? Thank you, etc.)

_____ repair miscommunications (e.g., Will you repeat that? The word is not on my board.)

B. List "significant" persons in the individual's life. _____

_____

1) Does the individual indicate recognition? _____

2) How?_____

_____

C. List "important" objects._____

_____

D. List important events._____

_____

E. Does the individual have a means to gain attention? _____

How? _____

5. Present Level of Expressive Communication

A. No sound used

B. Vocalizations

C. Consonant sounds

D. Uses words that are recognizable only to familiar partners

E. Intelligible words/signs/pictures

(Please list examples)_____

F. Intelligible two-word phrases

Intelligible in context:_____

Only to familiar listeners:_____

To others:_____

(Please list examples)

G. More than 2-word phrases

Intelligible in context:_____

Only to familiar listeners:_____

To others:_____

H. Approximation of vocabulary:

Under 20 words:_____

50 to 100 words:_____

Other:_____

I. Complexity of grammatical structures (simple sentences, many adjectives/adverbs, past tense, etc.): _____

_____

_____

J. Is the student's present level of expressive communication sufficient to meet his or her communication needs?

6. Communicative Interactions

A. Approximate number of interactions daily:

B. Communication partners (adults, peers, familiar/unfamiliar individuals, etc.):

C. Family perception about the importance of communication for this individual: _____

_____

D. Are parent/teacher/friends willing to learn and use a nonspeech communication system?_____

7. Additional Communication

Information:_____

_____

_____

_____

8. Impressions:_____

_____

_____

_____

_____

Appendix G Communication Assessment: Suggested Protocol

Does the child have sensory impairments?

Specialists need to help you in your work with children who have limited vision or hearing and children who have tactile or kinesthetic problems. Refer to a pediatric audiologist (hearing) or ophthalmologist (vision) who specializes in assessing children with severe disabilities. The slightest sensory deficit can (and does) have an impact on learning. For example, young children with even mild or fluctuating hearing losses are at risk for developing speech, language, and communication skills. Involvement of these specialists also is essential when working with children with multiple impairments (e.g., dual sensory, medically fragile). (Read *Listening and Hearing Supplement* carefully.)

Does the child have perceptual deficits?

Referral to specialists (occupational therapist, ophthalmologist, audiologist) experienced in this area is recommended. However, your observations are very important. Be vigilant and observe responses to stimuli.

- The incidence of visual perceptual problems in children with cerebral palsy is high. Also, cortical visual impairment is increasingly documented in children with developmental disabilities. Visual problems will affect learning and decisions about a child's communication program.
- Auditory perceptual problems may also be common in children with severe disabilities and affect learning and the development of language or a child's acceptance of synthetic speech. The environments of young children are often noisy and the "signal-to-noise" ratio (see the *Listening and Hearing Supplement*) further complicates a child's perception of sound, even if he or she has normal hearing.
- Some children are hypo- or hypersensitive to touch, which may have an impact on the type and position of materials you select. For example, children may (or may not) tolerate assistive devices mounted on or near their heads. *Note*: Occupational therapists can use successive approximation techniques and gradually normalize these reactions.

Does the child have motor deficits?

Occupational and physical therapists use observation, direct assessment, interviews, and checklists to obtain an understanding of the child's motor patterns and positioning and seating needs. Paralysis and motor planning problems interfere with a child's access to the environment, use of electronic/nonelectronic communication devices, and use of speech and standard augmentative techniques. Human-machine interface issues and other concerns need to be addressed (see *Positioning, Access, and Mobility Module* for a complete discussion).

How does the child learn?

Through observation, direct assessment, and interviews, professionals (particularly psychologists and educators) and family members learn how a child reacts to events as well as how he or she learns and retains new information; this enables them to discover, over time, what teaching methods are most effective. This information typically is far more useful to the team and to the child's success than grade-level equivalent scores, mental ages, or IQ scores.

What are the child's current communication skills and abilities?

Utilizing observation, direct assessment, interviews, and checklists, speech-language pathologists generally consider

- **modes of communication** – How does the child communicate? Does he or she gesture, vocalize, look, appear to expect something to occur? Does he or she use different modes of communication? With different partners? Which modes are effective and which are not? What modes do partners ignore and which do they respond to?
- **types of communication intents** – Does the child indicate pleasure, displeasure, make requests, refuse, joke, ask questions, and so on?
- **discourse characteristics** – Does the child initiate interaction, take turns, introduce conversational topics, terminate interactions appropriately? What does the child do when he or she is not understood? Does the child have strategies to "repair" a conversational breakdown? Does this vary with the partner and the context?

What is the child's language profile?

Speech-language pathologists use observation, interviews, checklists, and direct assessment to obtain a language profile. Helpful information includes whether a child can

- attach meaning to repeated events, people, objects, smells, etc., in the environment;
- attach meaning to single words for objects, actions, and relational concepts;
- attach meaning to pictures, pictographs, signs, synthesized speech, and so on;
- understand language as it increases in length and complexity;
- understand grammatical forms, including morphemes and syntactic structures;
- use language to solve problems/reason/think;
- use expressive vocabulary and language forms to interact with various people and to accomplish various communication tasks; and
- read and write or exhibit prereading and prewriting skills.

No single test (or checklist) exists that can provide information about all areas of language function*. It is also important to remember that language does not mean spoken English only. Assess children in their own language (e.g., sign, Spanish, print, etc.). See Figure G.1 for an example of a language profile.

* Roth, F., & Cassatt-James, E. (1989). The language assessment process: Clinical implications for individuals with severe speech impairments. *AAC, 5,* 65–72.

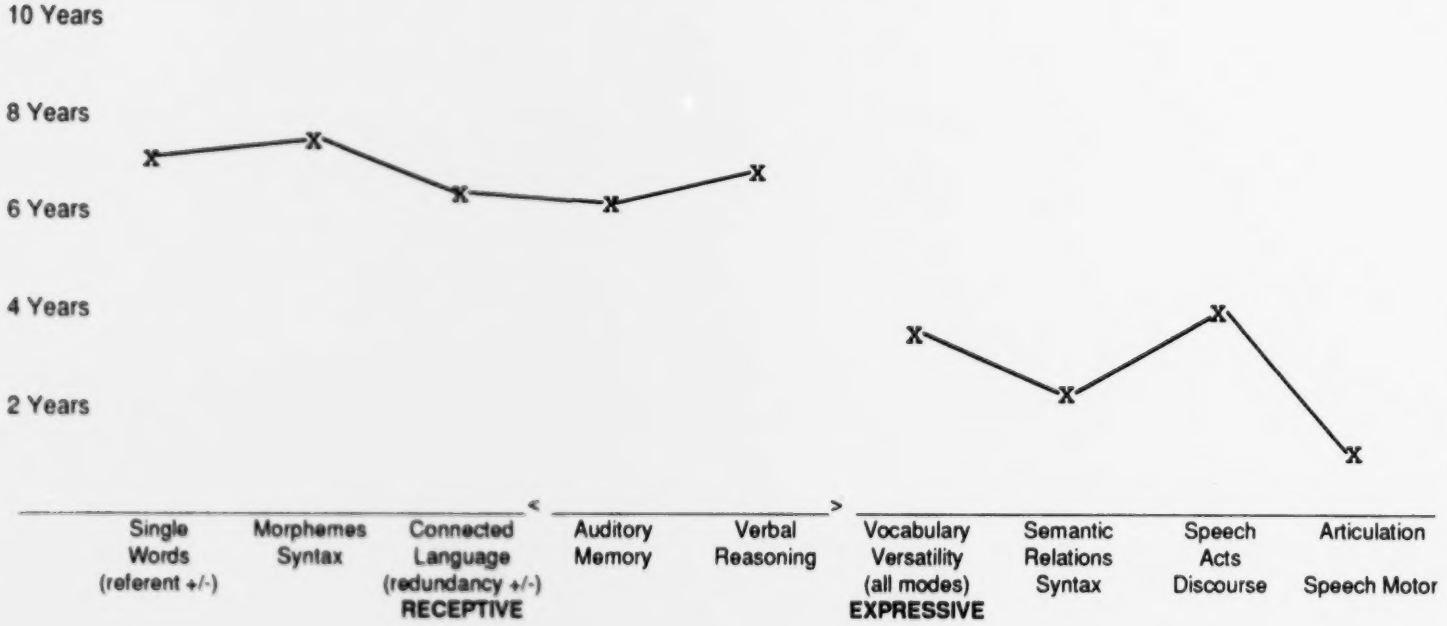
Figure G.1 - Sample language profile

LANGUAGE PROFILE - July 8, 1989

Name:

Chronological Age: 6 years, 7 months

Visual/Performance Abilities: approximately 6-7 years



Expressive modes available to child: speed approximations; signs = 10; communication device with approximately 300 symbols; gesture; mime.

Why does the child have difficulty talking?

Methods used to determine why a child doesn't talk include a hearing test, an oral motor assessment (observation of eating, drinking, and movement of the oral structures), a speech-motor assessment (observation of the ability to produce and sequence phonemes for speech), an articulation test (if some speech exists), and a language assessment. Structural problems involving the body parts used to speak (e.g., vocal fold paralysis, cleft-palate), severe language disabilities, and psycho-social problems sometimes account for a child's lack of speech. However, the more common reasons are

- hearing impairment;
- severe mental retardation; and
- speech motor dysfunction, which is discussed in more detail below.

What are the child's current speech-motor capabilities?

For children who hear, have language comprehension skills beyond a 1 1/2- to 2-year level, and do not talk, speech motor dysfunction should at least be considered. There are two major types of speech-motor dysfunction. *Dyspraxia* is defined as an impairment in speech due to partial loss of ability to perform coordinated acts in the absence of paralysis. *Dysarthria* is defined as paralysis of muscles involved in producing speech (e.g., tongue, lips, palate, jaw, vocal folds). Speech-language pathologists can work with the team to assess the child's speech-motor functioning.

Appendix H Partner Rating Scale

ADMINISTRATION INSTRUCTIONS

Prior to presenting the partner with the Partner Rating Scale, fill in the child's name, partner's name, descriptions of augmentative techniques, and names of the augmentative techniques in items 4-6, 9-16, 18, and 20-22. The partner then completes the scale in private. Most partners are able to complete the scale in 10-15 minutes. When the partner returns the scale, the clinician may wish to clarify some answers.

Example:
"I noticed that you like your child to use his communication board but that you felt he did not like it. Can you tell me a little more about that?"

Record clarifications provided by the partner under Additional Information.

All partner responses are transferred to the Rating Scale Summary Sheet for comparison to the child's responses. The clinician circles on the summary sheet any inconsistencies in child/partner reports.

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PACT
Partner Rating Scale

Child's Name: _____

Date: _____

Partner's Name: _____ Clinician: _____

Names/Descriptions of Augmentative Techniques:

(1) _____

(2) _____

Read each statement and circle the rating that best describes your feelings about it. The word **talk** refers only to talking by mouth or speech.

1. _____ (child's name) likes to talk.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

2. I like for _____ (child's name) to talk.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

3. Other people like for _____ (child's name) to talk.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

4. a. _____ (child's name) likes to use his/her _____ (augmentative technique).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

b. _____ (child's name) likes to use his/her _____ (augmentative technique).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

5. a. I like for _____ (child's name) to use his/her _____ (augmentative technique).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

b. I like for _____ (child's name) to use his/her _____ (augmentative technique).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

6. a. Other people like for _____ (child's name) to use his/her _____ (augmentative technique).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

b. Other people like for _____ (child's name) to use his/her _____ (augmentative technique).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

7. _____ (child's name) feels good about the way he/she talks.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

8. I feel good about the way _____ (child's name) talks.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

9. a. _____ (child's name) feels good about the way he/she uses the _____ (augmentative technique).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

b. _____ (child's name) feels good about the way he/she uses the _____ (augmentative technique).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

10. a. I feel good about the way _____ (child's name) uses his/her _____ (augmentative technique).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

b. I feel good about the way _____ (child's name) uses his/her _____ (augmentative technique).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

11. a. _____ (child's name) thinks it is important to use his/her _____ (augmentative technique).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

b. _____ (child's name) thinks it is important to use his/her _____ (augmentative technique).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

12. a. I think it is important for _____ (child's name) to use his/her _____ (augmentative technique).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

b. I think it is important for _____ (child's name) to use his/her _____ (augmentative technique).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

13. a. _____ (child's name) understands how to use his/her _____ (augmentative technique).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

b. _____ (child's name) understands how to use his/her _____ (augmentative technique).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

14. a. I understand how to use _____'s (child's name) _____ (augmentative technique).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

b. I understand how to use _____'s (child's name) _____ (augmentative technique).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

15. a. _____ (child's name) thinks he/she needs to use his/her _____ (augmentative technique) to do better in school.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

b. _____ (child's name) thinks he/she needs to use his/her _____ (augmentative technique) to do better in school.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

16. a. I think _____ (child's name) needs to use his/her _____ (augmentative technique) to do better in school.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

b. I think _____ (child's name) needs to use his/her _____ (augmentative technique) to do better in school.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

17. When talking, _____ (child's name) can say most things he/she wants to say.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

18. a. When using _____ (augmentative technique), _____ (child's name) can say most things he/she wants to say.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

b. When using _____ (augmentative technique), _____ (child's name) can say most things he/she wants to say.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

19. When _____ (child's name) talks, he/she can make most people understand.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

20. a. When _____ (child's name) uses the _____ (augmentative technique), he/she can make most people understand.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

b. When _____ (child's name) uses the _____ (augmentative technique), he/she can make most people understand.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

21. a. Using the _____ (augmentative technique) may improve _____'s (child's name) speech.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

b. Using the _____ (augmentative technique) may improve _____'s (child's name) speech.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

22. a. The rewards for using _____ (augmentative technique) justify my efforts to do so.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

b. The rewards for using _____ (augmentative technique) justify my efforts to do so.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

23. _____'s (child's name) present augmentative communication technique(s) suits his/her current needs and abilities.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Please use the space below to express your observations and concerns about your child's communication.

Additional Information:

PACT
Rating Scale Summary Sheet

Child's Name: _____ Partner's Name: _____

Date: _____

Code child/partner responses as follows:

1 = Very wrong/Strongly disagree
2 = A little wrong/Disagree
3 = Not right or wrong/Neutral
4 = A little right/Agree
5 = Exactly right/Strongly agree

No.	Topic	Child	Partner
Like			
1	Child Talk		
2	Partner Talk		
3	Others Talk		
4	Child A.T. (a)		
	Child A.T. (b)		
5	Partner A.T. (a)		
	Partner A.T. (b)		
6	Others A.T. (a)		
	Others A.T. (b)		
Feel Good			
7	Child Talk		
8	Partner Talk		
9	Child A.T. (a)		
	Child A.T. (b)		
10	Partner A.T. (a)		
	Partner A.T. (b)		
Importance			
11	Child A.T. (a)		
	Child A.T. (b)		
12	Partner A.T. (a)		
	Partner A.T. (b)		

No.	Topic	Child	Partner
Understand Use			
13	Child A.T. (a)		
	Child A.T. (b)		
14	Partner A.T. (a)		
	Partner A.T. (b)		
School Performance			
15	Child A.T. (a)		
	Child A.T. (b)		
16	Partner A.T. (a)		
	Partner A.T. (b)		
Expression			
17	Talk/Can Say		
18	A.T./Can Say (a)		
	A.T./Can Say (b)		
People's Understanding			
19	Talk/Understand		
20	A.C./Understand (a)		
	A.C./Understand (b)		
21	Speech Improvement		_____
22	Rewards/Efforts		_____
23	Suitability of A.T.		_____

Appendix I Child Rating Scale

ADMINISTRATION INSTRUCTIONS

Administer the Child Rating Scale in a quiet area without distractions or others present. Administration time may vary depending on the child's response rate, but 15-20 minutes are required. The clinician should be knowledgeable enough about the child's transmission techniques with augmentation to readily determine an appropriate response pattern for completion of this scale. The child must be able to reliably indicate 5 points. For some direct-selection techniques such as gross hand-pointing or eye gaze, it may be helpful to copy the circle answer codes on page 49, cut them out, and mount them farther apart. Manual scanning (the clinician points to each circle) at an appropriate rate for the child may also be used.

1. With the child, discuss and agree on the transmission technique to be used.
2. Show the circle answer codes to the child and explain what each circle means.

   Smallest circle:
   That's very wrong/Strongly disagree

   Next circle:
   That's a little wrong/Disagree

   Middle circle:
   That's not right or wrong/Neutral

   Next circle:
   That's a little right/Agree

   Largest circle:
   That's exactly right/Strongly agree
3. Ask the child to indicate each answer ("Show me *very wrong.*" "Show me *exactly right.*"). This gives the clinician an opportunity to observe reliability of means to indicate and comprehension of labels.
4. Say, "Now I'm going to read you a sentence about how you or your _____ (partner) feels. You show me the circle you think tells best how you or your _____ (partner) feels about the sentence. There is not a correct or incorrect answer. I want to know how you and your _____ (partner) are really feeling. Just point to the circle. Let's try one."
5. Place the answer circles in front of the child and read the first example (A) statement aloud. Then say (pointing to each circle): "Is that sentence very wrong, a little wrong, or exactly right about how you feel? Show me the circle that shows how you feel. Remember, there is no correct or incorrect answer. I just want to know how you feel." Circle the child's answer on the rating-scale form and confirm it with the child ("You pointed to *very wrong.* That must mean you really don't like candy."). If the child confirms that meaning, reinforce the child for listening and for expressing feelings about the sentence.
6. Read the second example (B), filling in the blank with the partner's name ("Mom" or "Miss Brown"). Be sure the child understands who the partner is. Then read the remaining sample statements (C and D).
7. If the child confirms the meaning on both examples, begin administering the scale items just as the examples were administered but without confirmation. If the child does not point or confirm on the first examples, repeat those examples and administer the second examples. If the child successfully completes the second examples, begin to administer the scale. If the child fails to successfully complete the task after two administrations of the second examples, the scale should not be administered.

Talking should be defined as *talking with your mouth* or *speaking.* Determine if more than one augmentative technique is to be addressed (sign

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language and communication board, or communication board and electronic aid). Discussion of more than one technique makes the task more complex. However, statements involving augmentative techniques have been repeated twice in case the clinician wishes to address two techniques. Before administration of the test, agree with the child on the names/labels used for the techniques. The same augmentative technique labels should also be used in the same order (a. versus b.) on the Partner Rating Scale. Occasionally use confirmations during the scale to be sure the child continues to understand the task.

At no time should the child be reinforced for *what* her or his opinions are. Provide intermittent reinforcement for listening, pointing, and expressing feelings about the sentence. When the twenty statements have been completed, you may wish to clarify some of the responses.

Example:
"John, I noticed that you think your teacher really doesn't like you to use your communication board. I'd like to know more about that. Why do you think that?"

After any clarifications, record the child's responses on the Rating Scale Summary Sheet for later comparison to partner responses.

The circle answer codes on the facing page provide five levels of response for the child. Establish a meaning for each circle from *very wrong/strongly disagree* to *exactly right/strongly agree* (see page 47). Be sure the child understands the gradations in meaning.

The circle answer codes are reproducible so you may copy and remount them for the child's convenience. The remounted circles may be laminated for durability.

Child Rating-Scale Circles

PACT
Child Rating Scale

Child's Name: _____

Date: _____

Partner's Name: _____ Clinician: _____

Names/Descriptions of Augmentative Technique(s):

(1) _____

(2) _____

See administration instructions.

i. a. I like candy.

very wrong	a little wrong	not right or wrong	a little right	exactly right

b. _____ (partner's name) likes candy.

very wrong	a little wrong	not right or wrong	a little right	exactly right

ii. a. I like to eat spiders.

very wrong	a little wrong	not right or wrong	a little right	exactly right

b. _____ (partner's name) likes to eat spiders.

very wrong	a little wrong	not right or wrong	a little right	exactly right

---

1. I like to talk.

very wrong	a little wrong	not right or wrong	a little right	exactly right

2. _____ (partner's name) likes me to talk.

very wrong	a little wrong	not right or wrong	a little right	exactly right

3. Other people like me to talk.

very wrong	a little wrong	not right or wrong	a little right	exactly right

4. a. I like to use my _____ (augmentative technique).

very wrong	a little wrong	not right or wrong	a little right	exactly right

b. I like to use my _____ (augmentative technique).

very wrong	a little wrong	not right or wrong	a little right	exactly right

5. a. _____ (partner's name) likes me to use my _____ (augmentative technique).

very wrong	a little wrong	not right or wrong	a little right	exactly right

b. _____ (partner's name) likes me to use my _____ (augmentative technique).

very wrong	a little wrong	not right or wrong	a little right	exactly right

6. a. Other people like me to use my _____ (augmentative technique).

very wrong	a little wrong	not right or wrong	a little right	exactly right

b. Other people like me to use my _____ (augmentative technique).

very wrong	a little wrong	not right or wrong	a little right	exactly right

7. I feel good about the way I talk.

very wrong	a little wrong	not right or wrong	a little right	exactly right

8. _____ (partner's name) feels good about the way I talk.

very wrong	a little wrong	not right or wrong	a little right	exactly right

9. a. I feel good about the way I use my _____ (augmentative technique).

very wrong	a little wrong	not right or wrong	a little right	exactly right

b. I feel good about the way I use my _____ (augmentative technique).

very wrong	a little wrong	not right or wrong	a little right	exactly right

10. a. _____ (partner's name) feels good about the way I use my _____ (augmentative technique).

very wrong	a little wrong	not right or wrong	a little right	exactly right

b. _____ (partner's name) feels good about the way I use my _____ (augmentative technique).

very wrong	a little wrong	not right or wrong	a little right	exactly right

11. a. I think it is important to use my _____ (augmentative technique).

very wrong	a little wrong	not right or wrong	a little right	exactly right

b. I think it is important to use my _____ (augmentative technique).

very wrong	a little wrong	not right or wrong	a little right	exactly right

12. a. _____ (partner's name) thinks it is important for me to use my _____ (augmentative technique).

very wrong	a little wrong	not right or wrong	a little right	exactly right

b. _____ (partner's name) thinks it is important for me to use my _____ (augmentative technique).

very wrong	a little wrong	not right or wrong	a little right	exactly right

13. a. I understand how to use my _____ (augmentative technique).

very wrong	a little wrong	not right or wrong	a little right	exactly right

b. I understand how to use my _____ (augmentative technique).

very wrong	a little wrong	not right or wrong	a little right	exactly right

14. a. _____ (partner's name) understands how to use my _____ (augmentative technique).

very wrong	a little wrong	not right or wrong	a little right	exactly right

b. _____ (partner's name) understands how to use my _____ (augmentative technique).

very wrong	a little wrong	not right or wrong	a little right	exactly right

15. a. I think I need to use my _____ (augmentative technique) to do better in school.

very wrong	a little wrong	not right or wrong	a little right	exactly right

b. I think I need to use my _____ (augmentative technique) to do better in school.

very wrong	a little wrong	not right or wrong	a little right	exactly right

16. a. _____ (partner's name) thinks I need to use my _____ (augmentative technique) to do better in school.

very wrong	a little wrong	not right or wrong	a little right	exactly right

b. _____ (partner's name) thinks I need to use my _____ (augmentative technique) to do better in school.

very wrong	a little wrong	not right or wrong	a little right	exactly right

17. When I talk, I can say what I want to say.

very wrong	a little wrong	not right or wrong	a little right	exactly right

18. a. When I use my _____ (augmentative technique), I can say what I want to say.

very wrong	a little wrong	not right or wrong	a little right	exactly right

b. When I use my _____ (augmentative technique), I can say what I want to say.

very wrong	a little wrong	not right or wrong	a little right	exactly right

19. When I talk, I can make most people understand.

very wrong	a little wrong	not right or wrong	a little right	exactly right

20. a. When I use my _____ (augmentative technique), I can make most people understand.

very wrong	a little wrong	not right or wrong	a little right	exactly right

b. When I use my _____ (augmentative technique), I can make most people understand.

very wrong	a little wrong	not right or wrong	a little right	exactly right

Additional Information:

PACT
Rating Scale Summary Sheet

Child's Name: _____ Partner's Name: _____

Date: _____

Code child/partner responses as follows:

1 = Very wrong/Strongly disagree
2 = A little wrong/Disagree
3 = Not right or wrong/Neutral
4 = A little right/Agree
5 = Exactly right/Strongly agree

No.	Topic	Child	Partner
	Like		
1	Child Talk		
2	Partner Talk		
3	Others Talk		
4	Child A.T. (a)		
	Child A.T. (b)		
5	Partner A.T. (a)		
	Partner A.T. (b)		
6	Others A.T. (a)		
	Others A.T. (b)		
	Feel Good		
7	Child Talk		
8	Partner Talk		
9	Child A.T. (a)		
	Child A.T. (b)		
10	Partner A.T. (a)		
	Partner A.T. (b)		
	Importance		
11	Child A.T. (a)		
	Child A.T. (b)		
12	Partner A.T. (a)		
	Partner A.T. (b)		

No.	Topic	Child	Partner
	Understand Use		
13	Child A.T. (a)		
	Child A.T. (b)		
14	Partner A.T. (a)		
	Partner A.T. (b)		
	School Performance		
15	Child A.T. (a)		
	Child A.T. (b)		
16	Partner A.T. (a)		
	Partner A.T. (b)		
	Expression		
17	Talk/Can Say		
18	A.T./Can Say (a)		
	A.T./Can Say (b)		
	People's Understanding		
19	Talk/Understand		
20	A.C./Understand (a)		
	A.C./Understand (b)		
21	Speech Improvement		_____
22	Rewards/Efforts		_____
23	Suitability of A.T.		_____

Communication Signal Inventory

SIGNAL	WHAT IT MEANS	WHAT TO DO/SAY
Eye gaze up	YES	
Eye gaze left, then up	YES (But it took me awhile to get there)	
Whole body jumps up, head up	YES!!!	
Left hand grasping in air, arm raised	Generally, I WANT SOMETHING Specifically: I WANT SOMETHING TO DRINK (a holdover from the sign for "milk")	• Provide choices of possible wants • Ask him to direct you to area of want • Watch eye gaze - he may flick back and forth to thing desired
Squinches up face, nose/eyes and turns to left hard Tries to bat his face or rub on headrest	SOMETHING ITCHES: MAYBE ALLERGY	• Ask if itchy - Rub nose/eyes for him • Look for possible allergens- a "cat" person, wool (dust mites love it), pollens (windy days worst) • Wipe face w/clean wet warm washcloth
Irritable, high tone, a lot of extension w/stuffy nose	REALLY ALLERGIC	• Look for direct exposure & eliminate if possible • Washcloth trick
Super rigid, arms extended, almost shaking, eyes panicky	I'M IN PAIN OR DISCOMFORT	• Check his feet - sometimes the inhibition of his straps is just too much - release • Check elsewhere - something digging into him (strap, belt, sharp edge) • Check his mouth - is he biting his tongue or cheek & can't let go? Tap jaw or run fingers alongside inside of cheek
Rigid, arms/legs extended but smiley	SOMETHING EXCITING HAPPENED: A BUS WENT BY, A NEAT SOUND	Just acknowledge and encourage him to relax
Looks to person, up to ceiling, then outside to door	LITERALLY: BUG OUT!	Up to you - it's *usually* a joke
Looks outside or to door	LET'S GO OUT	
Looks up (In context of people having a familiar conversation)	"YEAH" Affirming the story	
Generally cranky	• TOO LONG IN WHEELCHAIR - I NEED A BREAK • I'M BORED • I'M TIRED • I'M LONELY • I'M SICK	• Give him a break from current position/seating • Change activity • Do something less stimulating - Music? Read? • Pay attention, keep him company, engage him! • Check forehead for fever
Stiffen, grunts a little	I HAVE TO GO POOP NOW	• Ask if he needs to sit on the toilet seat • Take him to adapted toilet seat (if available) • If not, walk away from group for privacy, take him out of wheelchair, hold over shoulder or over your knees (on his tummy) then change him when he's finished

Note: This was completed by the parents of a young child with severe cerebral palsy.
Thanks to the Berkeley Unified School District for sharing this information

Communication Signal Inventory

SIGNAL	WHAT IT MEANS	WHAT TO DO/SAY
Starties & jumps (not usually, but may cry)	SOMETHING STARTLED ME (Even slight things you may not have noticed. i.e. sound, cough, sneeze, breeze, a too fast approach to him)	• Just acknowledge • Use humor - "Wow, what a giant sneeze. I think her nose flew out the window!" • If scared or crying: comfort, hugs, then humor
Looks away when calling to him or talking to him	I'M IGNORING YOU (A game - he's usually smiling)	• Use reverse psychology - "Whatever you do, <u>don't</u> look at me" He usually will. • If it is serious & you don't want to play his game - just tell him you need to see eye to eye and wait (He'll come around) Note: Resist physically turning his head to you. Be patient and wait. He is making a choice. It's <u>not</u> that he can't look at you.
Looking Away: When you might expect him to look at what is going on. (i.e. You're talking to him, someone's reading a book, a video is on)	DON'T WORRY, I'M LISTENING I'D RATHER FOCUS WITH MY EARS <u>He is really auditory.</u> He often prefers to focus in on an activity with his ears and <u>really enjoys</u> it. He loves the sound of conversations, foreign languages, reacts to different movements/instruments in musical pieces, pictures in his mind the visual of a book or movie his knows - occasionally flicking back to it with his eyes for confirmation of his memory	If you feel it's important that he sees, do the above. Often we will let him enjoy attending with his ears. He still "gets" what is going on without the added "keep my head/eyes steady" effort.
He can't do something you've seen him do before. (i.e. Eat well, right his head, hit his switch...)	• I'M POORLY POSITIONED • SOMETHING'S BUGGING ME (allergy, tired) • I HAVE TOO MUCH HIGH TONE OR LOW TONE TODAY	• Check to make sure his pelvis is back in chair/belt secure, shoulders back/chest straps secure, switches etc. in place • Check for allergens, ask parents if sleepy today • Just be aware that his tone changes constantly. He is never the same kid from day to day/hour to hour
He gets mad when you ask him a question or ask him to make a choice	• I TOLD YOU ALREADY • THAT'S NOT WHAT I SAID! • I CAN'T ANSWER. MY CHOICE IS NOT PRESENTED • I MADE A CHOICE BUT I WANT ANOTHER PERSON TO DO IT WITH ME OR GIVE IT TO ME (i.e. I want a drink but I want Mom instead of Dad to give it to me!) • I DON'T CARE TO ANSWER/CHOOSE	• Say "I'm sorry. Did you already give me an answer and I missed it? Let me try again." • Say "Did I misunderstand? Let me try again" • Ask if he needs another board/choices • Ask if he wanted someone else • Ask if he doesn't want to or care. Tell him you'll pick for him then (& only then)

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Appendix K Identifying Signaling Behaviors

Evaluation Strategy Grid

INPUT	OUTPUT: Oculomotor	Vocal	Motor
Visual			
Auditory			
Motokinesthetic			
Tactile			

Procedures:

1. Present stimulus/input (e.g. visual, auditory, motokinesthetic, tactile)
2. Observe initial response/output (e.g. eye movement, vocalization, arm movement, etc.).
3. Repeat and vary stimulus presentations under optimized or rehearsed conditions (e.g., parent or favorite toy present, child helped to manipulate toy).
4. Observe responses (e.g., increased movement, localization to stimulus, habituation, and so on).
5. Describe responses (see Appendix C for example).

Reprinted from: Carlson, F., Hough, S., Lipert E., & Young C. (1988). Developing augmentative communicative signaling behaviors in severely/profoundly developmentally delayed children. In S. Blackstone, E. Lucinda Cassatt-James, & D. Bruskin (Eds.), *Augmentative Communication: Implementation Strategies* (pp. 5.1-34 & 5.1-39). Rockville, MD: American Speech-Language-Hearing Association. Reprinted with permission.

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Sample of Completed Evaluation Strategy Grid

INPUT	OUTPUT: Oculomotor	OUTPUT: Vocal	OUTPUT: Motor
Visual Large bright objects	Increased eye movement if placed 12"-24" in front. If closer, child startles. If further, no response. If object is shaken against a dark backdrop, child gazes 5 seconds.	No vocal responses. If visual presentation is paired with sound, child opens mouth and attempts to vocalize with 50% success.	On initial presentation child goes into extension. Increase in arm movement noted after manipulation of object.
Auditory Speech and soundmakers, familiar and and unfamiliar voices	Increased eye movement. No localization except with a familiar voice.	No vocalization.	Initially observe generalized movement. With familiar sounds/ voices, child calmed.
Motokinesthetic Bend and stretch arm	Initially child turns away. During repeated manipulations of arm, child looked toward clinician.	Initially, no vocal response. Later in the activity child laughed.	Resisted movement initially and went into extension. Gradually, child relaxed.
Tactile Stroking part of child's body	No response or generalized eye movement. Gradually child looked toward part of body that was touched.	When stroking was paired with soft talking, soft phonation occurred.	Initially, the child startled. After awhile, the child began to move back and forth rhythmically.

E'S ACTION PLAN

6/20/89

E's Team: Augmentative Communication Team		
Name	**Role**	**Phone**
Sarah	ACT Facilitator SLP	
Dianne	Teacher Whittier**	
Tia	Aide Whittier **	
Pat	Psychologist	
Martha	ACT SLP**	
Mary	ACT SLP **	
Holly	ACT Manager SLP	
Louise	SLP Whittier	
Erin	Mother	
Katherine	Supervisor BSD	
Eugene	Father **	
Karen	Supervisor BSD	
Sue	ACT OTR Consultant	
Judy	OTR Whittier**	
Hildred	PT**	

** Will be implementing programs described below

E's Needs (identified by participants at 3/28 meeting):

Communicate basic needs and express internal state (tired, hurt, etc.) - 9
Make choices - 4
A word/symbol for Daddy - 3
Ask for food, drink, potty - 2
Explore her environment, play with toys - 2
Interact with peers (turn taking and turn giving)
Get attention - 1
Clap hands - 1
Express feelings - 1
Involve others in play activity -1
Express likes and dislikes consistently - 1
Respond to questions (Do you want cookies?) - 1

PLAN	*WHO*	*WHEN*	*HOW MEASURE*	*STATUS*
GOAL: Increase ability to express basic needs (i.e., eat, drink, "interact now," obtain objects, make action/object recur, get up, get down, no more, none, etc.)				
Objective # 1: Identify ways E signals basic needs				
1a. Develop chart # 1 - Signaling behaviors to monitor progress	Mary/Martha	5/7	Field test	Done
1b. Identify partners at school, day care, home	Mary/Martha	4/7	List/report to team	Done
1c. Teach partners to recognize & elicit targeted signals	Mary/Martha	5/15	Direct observation of primary partners (ongoing)	Ongoing
1d. Videotape examples of good interaction	Mary/Holly	ongoing 6/20	Change in E's behaviors (chart) Videotape at home, etc.	Done 5/7 Done 4/19 & 5/24
1e. Monitor & report progress at team meetings	Mary/Martha		Peer review of process/outcome	Pending
Objective # 2: Facilitate communicative use of vocalization				
2a. Rule out hearing loss	Erin	5/30	Results of audiometric testing	Quantity - variable
2b. Reinforce vocalizations	All Partners	ongoing	Increase of vocalizations on chart # 1	Quantity - restricted
2c. Monitor & report progress at team meetings	Mary/Martha	6/20	Peer review of process/outcome	Quantity - variable

PLAN	WHO	WHEN	HOW MEASURE	STATUS
Objective # 3: Increase communicative use of eye gaze				
3a. Increase eye gaze to people & objects	All partners **	ongoing	Observation and charting	5/22 Priority for training
3b. Monitor communicative use of eye gaze	Mary	1x weekly	Observation and charting	Ongoing
3c. Report progress	Mary & others	6/20	Peer review of process/outcome	Done 5/24
Objective # 4: Increase communicative use of reaching (i.e., requesting and choice making				
4a. Increase reaching to request objects (also encourage emerging "point")	All partners **	ongoing	Observation and charting	Need to position self and objects to facilitate her learning "people are tools" (e.g., looking from desired object to partners while reaching)
4b. Monitor communicative use of reaching	Mary	1x weekly	Observation and charting	Ongoing
4c. Report progress	Mary & others	6/20	Peer review of process/outcome	Done 5/24 Discussion re: reaching as undesirable behavior)
GOAL: Establish consistent behavior management approaches across home, school, and day care environments				
Objective # 1: Increase socially acceptable behaviors for chronological age & decrease other behaviors				
1a. Get consensus on strategies	Mary/partners	5/22	Peer review of plan 5/24	Done
1b. Implement and monitor plan	Partners **	Ongoing	Observation in all contexts	Will begin soon
GOAL: Increase development of functional play				
Objective # 1: Increase development of functional play				
1a. Develop checklist #2 - Schemas for relating to objects	Mary/Martha	5/1	Peer review	Done
1b. Establish baseline and monitor	Mary/Martha	5/7	Present objects & chart behaviors	Videotape to be analyzed
1c. Provide variety of objects/ facilitate explorations/interact to show functional use of objects	Partners	Ongoing	Periodic repetition of baseline tasks	Baseline complete

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PLAN	*WHO*	*WHEN*	*HOW MEASURE*	*STATUS*
GOAL: Provide language stimulation at appropriate levels				
Objective # 1: Encourage partners to use language development facilitation principles				
1a. Provide information/ modelling	Mary	6/20	Observations in classroom/day care/home	Ongoing monitoring
1b. Implement and monitor plan	Partners **	Ongoing	Observation in all contexts	
GOAL: Integrate functional communication goals in all activities				
Objective # 1: Develop plan for school, day care, home, therapy so communication goals are incorporated during activities				
1a. Provide framework to team	Mary/Martha	9/1	Matrices completed	
1b. Review activities with regard to communication	All partners **	9/15	Matrix review by Mary	
1c. Implement plan	All partners **	9/15	Evaluate effects by asking partners	

Appendix M Consumer Satisfaction Questionnaire

Berkeley Unified School District

AUGMENTATIVE COMMUNICATION TEAM (ACT)
SATISFACTION QUESTIONNAIRE

(* Developed by Sarah Blackstone, Joann Biondi, Mary Hunt Berg, Glenn Carter, 1990)

ID Code: (Your mother's first initial, last digit in your address, number of people in your family)

____ ____ ____

Role on AC Team (please circle)

Family	Student	Teacher
Speech path	Occup. Therapist	Distributors
Physical Therapist	Instruct. aide	Rehab.Engineer
Psychologist	Administrator	Other, please specify_____

Ratings = Strongly agree 1 2 3 4 5 Strongly disagree or N/A

STRUCTURE

ACT INTERVENTION PROCESS

1. Assessment and evaluation of effectiveness

1. I feel that the initial evaluation process provides sufficient information to establish goals and objectives for intervention. 1 2 3 4 5 n/a

2. I feel that treatment approaches that are developed by the team are effective. 1 2 3 4 5 n/a

3. I am able to tell if the strategies/techniques I use during intervention are working. 1 2 3 4 5 n/a

4. The process of assessment and program development on the ACT is a collaborative effort. 1 2 3 4 5 n/a

5. I feel that ACT assessment and program development has led to a coordinated, comprehensive curriculum for each student. 1 2 3 4 5 n/a

6. I am a fully participating member of my team. 1 2 3 4 5 n/a

2. Program development and communication system component implementation

1. I am familiar with a variety of assistive devices. 1 2 3 4 5 n/a

2. I have the essential skills and knowledge to use the necessary assistive devices and technologies appropriate for each student. 1 2 3 4 5 n/a

3. I can teach students how to use augmentative communication (AC) aids and techniques. 1 2 3 4 5 n/a

4. I can teach partners of students who use AC how to interact and facilitate communication. 1 2 3 4 5 n/a

5. I know how to match features of communication aids/techniques to children's needs and abilities. 1 2 3 4 5 n/a

6. I feel comfortable using communication aids and techniques recommended by the team. 1 2 3 4 5 n/a

3. Expansion and Independence

1. I feel the ACT program has resulted in an increased level of independence for students served by the team. 1 2 3 4 5 n/a

2. The ACT program has resulted in student's communicating in new environments. 1 2 3 4 5 n/a

3. The ACT program has resulted in the student's communicating with new partners. 1 2 3 4 5 n/a

4. I feel comfortable with students receiving less intense services as they gain more skills. 1 2 3 4 5 n/a

4. Integration and Growth

1. After students have achieved certain goals and objectives, I know how to monitor their maintenance. 1 2 3 4 5 n/a

2. I am aware of how to get help if and when I need it. 1 2 3 4 5 n/a

3. I feel there are adequate resources established so that team involvement can be minimal for some students. 1 2 3 4 5 n/a

PROCESS

I.E.P. AND CURRICULUM

1. I.E.P.'s developed in collaboration with the ACT promotes integration and participation in the educational process. 1 2 3 4 5 n/a

2. My goals and objectives for a student are considered in the development of the I.E.P. 1 2 3 4 5 n/a

3. The combined use of the ACT Action Plan and an IEP has made the whole IEP process easier. 1 2 3 4 5 n/a

4. The combined use of the ACT Action Plan and an IEP has made the IEP process more relevant. 1 2 3 4 5 n/a

5. I like the use of curricular domains in the I.E.P. 1 2 3 4 5 n/a

6. Development of the IEP in the Berkeley School District is a multi-disciplinary, collaborative process for students served by the ACT. 1 2 3 4 5 n/a

7. IEP's developed in collaboration with the ACT reflect a philosophy of age-appropriate placement, activities, and curriculum. 1 2 3 4 5 n/a

ACT ACTION PLANS

1. I am aware of my role and responsibilities as outlined in the action plans. 1 2 3 4 5 n/a

2. I feel the action plans help the ACT monitor and achieve I.E.P. goals and objectives. 1 2 3 4 5 n/a

3. ACT action plans promote efficient team functioning in meeting the needs of students. 1 2 3 4 5 n/a

4. I could do my job just as well without an action plan. 1 2 3 4 5 n/a

5. Action plans make me feel accountable to the student and the team. 1 2 3 4 5 n/a

6. How many times do you refer to action plans between meetings? 1 2 3 4 5 n/a

ASSISTIVE TECHNOLOGIES (augmentative communication aids/techniques - both high and low tech, software, and computers)

1. I know what technology exists in the district. 1 2 3 4 5 n/a

2. I can obtain existing technology in a timely manner. 1 2 3 4 5 n/a

3. I know how to order equipment/technology. 1 2 3 4 5 n/a

4. I feel that students have access to the tools/technologies they need to participate in the educational process. 1 2 3 4 5 n/a

5. I know what to do when equipment does not work. 1 2 3 4 5 n/a

6. Maintenance and repair services are adequate. 1 2 3 4 5 n/a

TEAM MEETINGS (Monthly and cluster meetings)

1. I am adequately informed of ACT meeting dates and times. 1 2 3 4 5 n/a

2. My experience is the schedule for the meeting is adhered to. 1 2 3 4 5 n/a

3. I find the ACT meetings to be informative about each student's program and progress. 1 2 3 4 5 n/a

4. I think the ACT meetings facilitate each student's program development. 1 2 3 4 5 n/a

5. I have learned a great deal about AC and providing services to students with severe communication disorders by attending team meetings. 1 2 3 4 5 n/a

6. I meet with individual team members as needed. 1 2 3 4 5 n/a

PERSONNEL RELATIONS

1. I feel there is adequate communication between myself and other ACT members. 1 2 3 4 5 n/a

2. My feelings, opinions information, and needs are listened to and respected by other ACT members. 1 2 3 4 5 n/a

3. Information and programs are adequately explained to me. 1 2 3 4 5 n/a

4. I respect the knowledge and skills of other team members. 1 2 3 4 5 n/a

5. I'm glad to be a member of the AC Team. 1 2 3 4 5 n/a

6. Sometimes team members don't always agree or even get along. I feel there are opportunities to resolve such differences. 1 2 3 4 5 n/a

7. I feel comfortable resolving differences as they occur. 1 2 3 4 5 n/a

8. Differences have been resolved satisfactorily. 1 2 3 4 5 n/a

OUTCOME

EFFECTS OF ACT INVOLVEMENT AND INTERVENTION ON CHILDREN'S ABILITIES, OPPORTUNITIES, AND LEVEL OF PARTICIPATION.

1. My impression is that children/students served by the ACT have increased in their ability to communicate with:

parents..... 1 2 3 4 5 n/a

siblings..... 1 2 3 4 5 n/a

other relatives..... 1 2 3 4 5 n/a

family friends..... 1 2 3 4 5 n/a

friends..... 1 2 3 4 5 n/a

peers..... 1 2 3 4 5 n/a

school staff..... 1 2 3 4 5 n/a

ACT members..... 1 2 3 4 5 n/a

community personnel..... 1 2 3 4 5 n/a

strangers..... 1 2 3 4 5 n/a

2. My impression is that children served by the ACT now have more opportunities to communicate and participate in:

classroom academics..... 1 2 3 4 5 n/a

other classroom activities..... 1 2 3 4 5 n/a

peer interaction..... 1 2 3 4 5 n/a

school-wide activities (field trips,etc.)..... 1 2 3 4 5 n/a

community activities..... 1 2 3 4 5 n/a

vocational activities..... 1 2 3 4 5 n/a

home/family functions..... 1 2 3 4 5 n/a

3. My impression is that children served by the ACT actively participate more in:

classroom academics..... 1 2 3 4 5 n/a

other classroom activities..... 1 2 3 4 5 n/a

peer interaction..... 1 2 3 4 5 n/a

school-wide activities (field trips,etc.) 1 2 3 4 5 n/a

community activities..... 1 2 3 4 5 n/a

vocational activities..... 1 2 3 4 5 n/a

home/family functions..... 1 2 3 4 5 n/a

4. The number of partners children interact and communicate with has increased significantly due to ACT participation. 1 2 3 4 5

5. Children can more effectively express needs, opinions, and feelings due to a ACT participation. 1 2 3 4 5 n/a

6. Children have made more rapid progress within their curriculum since their involvement with the ACT. 1 2 3 4 5 n/a

TEAM MEMBER EFFECTS

1. I have a more positive attitude about students who have severe communication problems. 1 2 3 4 5 n/a

2. I have gained and use new skills. 1 2 3 4 5 n/a

3. I am more knowledgeable about the augmentative communication area. 1 2 3 4 5 n/a

4. I am more interested in my job. 1 2 3 4 5 n/a

5. I want to learn more. 1 2 3 4 5 n/a

6. Involvement in the ACT has affected my professional goals and plans. 1 2 3 4 5 n/a

7. I have used the knowledge and skills gained through my ACT involvement with other students not served by the team. 1 2 3 4 5 n/a

8. I feel comfortable helping other district staff with students who may have similar needs. 1 2 3 4 5 n/a

The three things I like best about my involvement with the ACT are:

_____

The three things I like least about my involvement with the ACT are:

_____

Please add any suggestions below to help us improve our services:

_____

A's IEP

Annual Goal: A will actively participate in 1st grade curriculum as taught in regular education classroom (with support from Augmentative Communication Team [ACT] using appropriate AC techniques, aids, strategies, adaptive equipment and software.		**Domain:** Academic
Instructional Objectives On academic goals assignments will be altered to the length needed for A to demonstrate competency	**Implementer**	**As Measured By**
This student will: within a year demonstrate literacy skills as specified in 1st grade curriculum enabling her to read at a 1st grade level using computer and appropriate software, page turner and other necessary peripherals	Regular Educator, Instructional Aide and ACT support	Basic test results, teacher-made assessment, and as monitored by ACT action plans
This student will: within a year demonstrate the ability to produce independent written work at a 1st grade level as specified in the curriculum using word processing programs, computer and necessary peripherals	Regular Educator, Instructional Aide and ACT support	Writing samples, teacher judgment, district standards of pupil achievements, and as monitored by ACT action plans
This student will: within a year demonstrate math concepts; addition, subtraction; and specific math applications at a 1st grade level provided with remediation over the summer, using computer, appropriate software, and other adaptive materials.	Regular Educator with Teacher of Orthopedically Handicapped Students and ACT support	Tests (e.g., keymath), teacher-made assessment, software data, and as monitored by ACT action plans
This student will: within a year demonstrate spelling abilities at 1st grade level using adaptive equipment, light-tech aids and techniques, computer peripherals, and appropriate software	Regular Educator, Instructional Aide, and ACT support	Teacher-made assessment, tests and as monitored through ACT action
This student will: within a year actively participate in and demonstrate understanding of 1st grade social studies curriculum using AC techniques (Light Talker), computer and peripherals	Regular Educator, Instructional Aide, and ACT support	Tests, teacher-made assessments, and as monitored through ACT action plans
This student will: within a year actively participate in and demonstrate understanding of 1st grade science curriculum using adaptive equipment techniques as necessary	Regular Educator, Instructional Aide, and ACT support	Tests, teacher-made assessments, and as monitored through ACT action plans
This student will: within a year actively participate each day in class discussions with assistance from teachers using AC strategies, light technologies, her communication device and adaptive equipment as needed	Regular Educator, Instructional Aide, Speech-language Pathologist (SLP) and ACT support	ACT data collection as monitored through action plans
This student will: within a year actively participate independently in class discussions using her device at least 3x weekly without prompts	Regular Educator with Instructional Aide, SLP, and ACT support	ACT data collection and as monitored through action plans

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A's IEP

Annual Goal: A will demonstrate an increase in personal responsibility		**Domain:** Personal
Instructional Objectives	**Implementer**	**As Measured By**
This student will: within a year assist with systematic training of partners (peers & staff) in the use of a variety of communication techniques	*A with support from SLP and ACT.*	Increase in number of peers/adults who demonstrate understanding of equipment and strategies.
This student will: within a year demonstrate knowledge of and use at least four conversational repair strategies during class activities.	A with SLP and ACT support	Data collected and reported at ACT meetings.
This student will: within a year increase vocalizations in different situations for different functions (i.e., get attention, protest, indicate problems, produce refrains, express excitement)	A with SLP and ACT support	Frequency of data collected on the function of vocalizations and monitored through action plans.
This student will: within a year demonstrate ability to identify two areas she is having difficulty with (e.g., getting attention, spelling, math, etc.) + appropriate strategies to deal with the difficulty	A with Regular Educator, SLP, Instructional Aide and ACT support	Data collected and monitored through action plans.

Annual Goal: A will actively participate in community-related functions		**Domain:** Community
Instructional Objectives	**Implementer**	**As Measured By**
This student will: accompany her class on all field trips and participate using LT and other equipment as needed (e.g., liftgate bus)	Regular Educator, SLP, Instructional Aide and ACT support	Teacher report and monitored through ACTaction plans.
This student will: use learned academic, mobility, and social skills in a community setting to independently complete a desired task or safely reach a specific destination using light- to high-tech equipment as needed	Teacher of Orthopedically Handicapped Students with ACT support	Ability to perform without assistance from staff

Annual Goal: A will actively participate in leisure activities with peers with support from ACT using adaptive equipment and AC techniques, aids and strategies		**Domain**: Recreational
Instructional Objectives	**Implementer**	**As Measured By**
This student will: within a year participate regularly with peers during recess in at least three different activities on the playground using her electric wheelchair and other adaptive equipment as needed	Regular Educator, Instructional Aide, OT, with ACT support; Adaptive Physical Educator (APE)	Adaptive Physical Educator, APE report and ACT data collected by OT as reported in action plans
This student will within a year actively participate in at least two board games and two computer games with peers using appropriate high and light tech aids, adaptive equipment and appropriate software	Regular Educator, Instructional Aide, Teacher of Orthopedically Handicapped Students with ACT support	Data collected and reported at ACT meetings.
This student will: within a year actively participate in on-campus recreational activities with her class using adaptive equipment and AC aids, techniques and strategies as needed	Regular Educator, Instructional Aide with ACT support, APE	Teacher report and ACT data collected as reported in action plan

Appendix O Resources on Devices & Implementation Strategies

Manufacturers/Vendors*

The following is a selected listing of manufacturers/vendors of augmentative communication/education technology. For a more comprehensive list, contact TRACE Research and Development Center, Room S-151 Waisman Center, 1500 Highland Avenue, University of Wisconsin, Madison, WI 53705-2280, (608) 262-6966.

ABLENET
1081 10th Avenue, SE
Minneapolis, MN 55414
(800) 322-0956

Access Unlimited
3535 Briarpark Drive, Suite 102
Houston, TX 77042-5235
(713) 781-7441

Adaptive Communication Systems, Inc.
Box 12440
Pittsburgh, PA 15231
(800) 247-3433

Apple Computer, Inc.
Worldwide Disability Solutions Group
20525 Mariani Avenue
Cupertino, CA 95014
(408) 974-7910

Arroyo & Associates, Inc.
2549 Rockville Centre Parkway
Oceanside, NY 11572
(516) 763-1407

Blissymbolics Communication International
24 Ferrand Drive
Don Mills, Ontario M3C 3N2 Canada
(416) 421-8377

Burkhart Toys
6201 Candle Court
Eldersburg, MD 21784
(410) 795-4561

Canon, Inc.
One Canon Plaza
Lake Success, NY 11042

Communication Aid Manufacturers Association
1101 Connecticut Avenue, NW, Suite 700
Washington, DC 20036
(202) 857-1138

Creative Communicating
2875 Cedar Mill Crossing
Acworth, GA 30101
(404) 975-8256

Creative Teaching Press
PO Box 6017
Cypress, CA 90630
(714) 995-7888

Crestwood Company
6625 N. Sidney Place
Milwaukee, WI 53209
(414) 352-5678

DADA
249 Concord Avenue, Unit 2
Toronto, Ontario M6H 2P4 Canada
(416) 762-0265

* This listing was compiled by the American Speech-Language-Hearing Association (ASHA). It does not attempt to be all-inclusive nor does it imply ASHA endorsement.

Dickey Engineering
3 Angel Road
North Reading, MA 01864
(508) 664-2010

Don Johnston Developmental Equipment, Inc.
PO Box 639
Wauconda, IL 60084
(800) 999-4660

Dunamis, Inc.
3620 Highway 317
Suwanee, GA 30174
(800) 828-2443

ECHO Speech Corporation
6420 Via Real
Carpinteria, CA 93013
(805) 684-4593

Enabling Technologies Co.
3102 SE Jay Street
Stuart, FL 34997
(407) 283-4817

Facilitated Communication Institute
Syracuse University
311 Huntington Hall
Syracuse, NY 13244-2340
(315) 443-9657

Ginn Publishing
225 West 34th Street, # 1105
New York, NY 10001
(800) 359-5980

IBM Corporation Special Needs Systems
PO Box 1328
Boca Raton, FL 33429-1328
(800) 426-2133 (voice)
(800) 284-9482 (TDD)

Imaginart
PO Box 1868
Idyllwild, CA 92349
(714) 659-5905

Innocomp
33195 Wagon Wheel Drive
Solon, OH 44139
(216) 248-6206

Lekotek
3035 North Druid Hills Road
Atlanta, Ga 30329
(404) 633-3430

Mayer-Johnson Company
PO Box 1579
Solana Beach, CA 92075-1579
(619) 481-2489

Phonic Ear, Inc.
250 Camino Alto
Mill Valley, CA 94941
(800) 227-0735

Poppin and Company
Picsyms Division
Rt. 1, Box 2315
Unity, ME 04988
(207) 437-2746

Prentke Romich Company
1022 Heyl Road
Wooster, OH 44691
(800) 642-8255

R. J. Cooper & Associates
24843 Del Prado, Suite 283
Dana Point, CA 92629
(714) 240-1912

Special Needs Project
(Books about Disabilities and Health for Children and Families)
1482 East Valley, #A-121
Santa Barbara, CA 93108
(800) 333-6867

Sentient Systems Technology, Inc.
5001 Baum Boulevard
Pittsburgh, PA 15213
(800) 344-1SST

TASH (Technical Aids and Systems for the Handicapped), Inc.
91 Station Street
Ajax, Ontario L1S 3H2 Canada
(416) 686-4129

Tiger Communication Systems
155 E. Broad Street, # 325
Rochester, NY 14604
(716) 454-5134

Toys for Special Children
385 Warburton Avenue
Hastings-On-Hudson, NY 10706
(914) 478-0960

Unicorn Engineering, Inc.
5221 Central Avenue, Suite 205
Richmond, CA 94804
(415) 528-0670

Wayne County Intermediate School District
Data Processing/ADAMLAB
33500 Van Born Road
Wayne, MI 48184
(313) 467-1415

Words +, Inc.
PO Box 1229
Lancaster, CA 93584
(800) 869-8521

Wright Group
19201 120th Avenue, NE
Bothell, WA 98011-9512
(800) 523-2371

Xerox Imaging Systems, Inc.
9 Centennial Drive
Peabody, MA 01960
(800) 343-0311

Zygo Industries, Inc.
PO Box 1008
Portland, OR 97207-0838
(800) 234-6006

Print Resources*

***Assistive Technology and the Individualized Education Program* (1992)**
By: RESNA Technical Assistance Project
RESNA TA Project
1101 Connecticut Avenue, NW, Suite 700
Washington, DC 20036
(202) 857-1140

Augmentative and Alternative Communication (1992)
By: Beukelman, D., & Mirenda, P.
Paul H. Brookes Publishing Co.
PO Box 10624
Baltimore, MD 21285-0624
(410) 337-9580

***Augmentative Communication: Implementation Strategies* (1988)**
Eds: Blackstone, S., & Cassatt–James, E.L., and Bruskin, D.
American Speech-Language-Hearing Association
10801 Rockville Pike
Rockville, MD 2120852
(301) 897-5700

Communication Without Speech. A guide for parents and teachers
By: Blumberg, K., & Johnson, H.
The Australian Council for Educational Research Ltd.

***The Early Communication Process Using Microswitch Technology* (in press)**
By: Rowland, C., & Schweigert, P.
Communication Skill Builders, Inc.
3830 E. Bellevue/PO Box 42050
Tucson, AZ 85733
(602) 323-7500

***Emergent Literacy Fun* (in press)**
By: Musselwhite, C.
S.E. AC Conference Publications
2430 11th Avenue North
Birmingham, AL 35234

* This listing was compiled by the American Speech-Language-Hearing Association (ASHA). It does not attempt to be all-inclusive nor does it imply ASHA endorsement.

The Empowering of Joslin (1992)
By: McNaughton, S.
Sharing to Learn
PO Box 986
Toronto, Ontario L3T 4A5 Canada
(416) 771-1491

Engineering the Preschool Classroom for Interactive Symbol Communication: 18 Months and Above (1992)
By: Goossens', C., & Crain, S.
S.E. AC Conference Publications
2430 11th Avenue North
Birmingham, AL 35234

Enhancing Childrens'Communication: Research Foundations for Intervention (in press)
Eds: Kaiser, A., & Gray, D.
Paul H. Brookes Publishing Co.
PO Box 10624
Baltimore, MD 21285-0624
(410) 337-9580

Handbook of Assistive Technology (1992)
Eds: Church, G., & Glennon, S.
Singular Publishing Co.
4284 41st Street
San Diego, CA 92105-1197

Literacy Learning and Persons with Severe Speech Impediments (1993)
Eds: Yoder, D., & Koppenhaver, D.
In: *Topics in Language Disorders,*
Aspen Publishers, Inc.
7201 McKinney Circle
Frederick, MD 21701
(800) 638-8437

Mini-Grants and Volunteers (1991)
By: Musselwhite, C.
S.E. AC Conference Publications
2430 11th Avenue North
Birmingham, AL 35234

Songbook: Signs and Symbols for Children (1992)
By: Musselwhite, C.
Special Communications
916 W. Castillo Drive
Litchfield Park, AZ 85340
(602) 935-4656

Tangible Symbol Systems: Symbolic Communication for Individuals with Multisensory Impairments (1990)
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